

NOV 26 1963

CRPL-F 227 PART A

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FOR OFFICIAL USE

PART A
IONOSPHERIC DATA

ISSUED
JULY 1963

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

IONOSPHERIC DATA

CONTENTS

	<u>Page</u>
Ionospheric Data (revised text)	ii
Table of Smoothed Observed Zurich Sunspot Numbers .	iii
World-Wide Sources of Ionospheric Data.	iv
Tables of Ionospheric Data	1
Graphs of Ionospheric Data	26
Index of Tables and Graphs of Ionospheric Data in CRPL-F227 (Part A).	51

IONOSPHERIC DATA

The CRPL-F series bulletins are issued as part of the responsibility of the Central Radio Propagation Laboratory for the exchange and distribution of ionospheric and related geophysical data. Part A, "Ionospheric Data," and Part B, "Solar-Geophysical Data," of the CRPL-F series present a variety of data in convenient form for use in research in radio propagation and the ionosphere and in other geophysical problems.

The current form of the tables of ionospheric data provides the monthly medians and, in addition, the number of values entering into the median determination (count) for all ionospheric characteristics listed. Also, when available, the upper and lower quartile values indicated by UQ and LQ in the tables, are listed for f_oF_2 , $h'F_2$, $h'F$, and $M(3000)F_2$. Quartile values are not listed for the other characteristics because of space limitations. The tables are prepared by IBM machine methods.

Beginning with CRPL-F221, Part A, "Ionospheric Data," the hourly median values for the graphs of critical frequencies and $M(3000)F_2$ were plotted by machine methods instead of manually, as in earlier issues. Graphs of critical frequencies and $M(3000)F_2$ will continue to appear. Graphs of percentage of time of occurrence for fEs and virtual heights of the regular ionospheric layers are no longer included. Data on percentage of time of occurrence of fEs above 3, 5, and 7 Mc are available from the CRPL and the IGY World Data Center for Airglow and Ionosphere.

For many years, the tables of ionospheric data appearing in the F series, Part A, listed values of medians recomputed at CRPL. While this practice enforced a certain uniformity, it was subject to some valid criticism for tampering with the original data. The tables and graphs now show the ionospheric data as they are provided by the originating laboratory. Responsibility for the accuracy and reliability of the data rests entirely with the originator.

Medians of data for the U.S. stations are computed in accordance with the recommendations of the World-Wide Soundings Committee. Data will appear in the F series, Part A, only when the complete daily-hourly tabulations have been received by the CRPL or the IGY World Data Center A for Airglow and Ionosphere.

Information on symbols, terminology, and conventions may be found in the "URSI Handbook of Ionogram Interpretation and Reduction, of the World-Wide Soundings Committee," edited by W. R. Piggott and K. Rawer (Elsevier, 1961), which supersedes previous documents. A list of symbols is available from CRPL on request.

The following table contains the latest available information on smoothed observed Zurich sunspot numbers, beginning with the minimum of April 1954. Final numbers are listed through June 1962, the succeeding values being based on provisional data.

Smoothed Observed Zurich Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	10	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	146	150	151	156	160	164
1957	170	172	174	181	186	188	191	194	197	200	201	200
1958	199	201	201	197	191	187	185	185	184	182	181	180
1959	179	177	174	169	165	161	156	151	146	141	137	132
1960	129	125	122	120	117	114	109	102	98	93	88	84
1961	80	75	69	64	60	56	53	52	52	51	50	49
1962	45	42	40	39	39	38	36	34	32	31	30	30

Units of Ionospheric Data Tables

foF2, foEs - - - Tenths of a megacycle
 foF1, foE - - - Hundredths of a megacycle
 h'F2, h'F, h'E - Kilometers
 (M3000)F2 - - - Hundredths

NOTE: Occasionally, when the median falls between two of the observed values, the median is carried an extra decimal place beyond these units. Those cases are easily identifiable by the extra digit appearing to the right of the number, in a column usually left blank.

MED - Median
 CNT - Count
 UQ - Upper Quartile
 LQ - Lower Quartile

WORLD - WIDE SOURCES OF IONOSPHERIC DATA

THE IONOSPHERIC DATA GIVEN IN TABLES 1 TO 100 AND FIGURES 1 TO 100 WERE ASSEMBLED BY THE CENTRAL RADIO PROPAGATION LABORATORY FOR ANALYSIS, CORRELATION AND DISTRIBUTION. THE FOLLOWING ARE THE SOURCES OF THE DATA IN THIS ISSUE:

REPUBLICA ARGENTINA, MINISTERIO DE MARINA
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FT. MONMOUTH, NEW JERSEY
OKINAWA I.
THULE, GREENLAND
WHITE SANDS, NEW MEXICO

NATIONAL BUREAU OF STANDARDS, UNITED STATES OF AMERICA
(CENTRAL RADIO PROPAGATION LABORATORY)
MAUI, HAWAII

TABLE 25
CHRYSTECHROM, NEW ZEALAND
143-65, 172-86f

TABLE 33

159.8N. 17.6E)

UPPSALA, SWEDEN

TIME 15.0E

[illegible]

TABLE 35

(50.0N, 14.6E)

PRILHONICE • CZECHOSLOVAKIA

TIME 0.0

[illegible]

TABLE 34

(52.2N, 21.2E)

WARSAW • POLANO

TIME 15.0E

[illegible]

TABLE 36

(49.9N, 97.6W)

WINNIPEG, CANADA

TIME 90.0W

[illegible]

SWEEP 0.33 MC TO 20.0 MC IN 3 MINUTES.

SEPTEMBER, 1961

SWEEP 1.0 MC TO 10.0 MC IN 20 SECONDS.

SEPTEMBER • 1961

SWEEP 1.0 MC TO 18.0 MC.

SEPTEMBER, 1961

TABLE 39

(16.4N, 120.6E)

[illegible]

SWEEP 1.0 MC TO 25.0 MC IN 27 SECONDS.

SEPTEMBER • 1961

TABLE 37

[illegible]

SWEEP 1.0 MC TO 25.0 MC IN 30 SECONDS.

SEPTEMBER, 1961

TABLE 39
PERU-ARGENTINA
193-25-65-241

[illegible]

COULD (C) = 100 - C

TABLE 40
OKINAWA I.
(26.3N, 127.8E)

FOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
foE	MED	8.3	24	62	57	50	67	80	73	76	72	71	80	95	107	108	112	112	126	105	101	86	72	63	60
	CAT	2.4	22	26	27	27	24	30	31	34	32	30	30	39	30	30	37	31	31	31	31	30	29	26	26
	LO	98	70	51	57	55	50	58	65	61	78	78	70	105	94	111	122	118	197	120	184	78	59	55	57
	U	26	50	51	44	45	45	45	45	45	66	61	61	61	61	61	61	61	61	61	61	61	61	61	61
h'E	MED																								
	CAT																								
	LO																								
	U																								
h'F	MED																								
	CAT																								
	LO																								
	U																								
MDS00IF2	MED	205	290	310	310	310	310	320	360	345	330	300	280	280	290	290	300	310	330	330	325	300	280	270	
	CAT	21	22	24	32	32	32	31	29	31	29	28	30	29	29	27	29	30	31	29	31	29	23	23	
	LO	270	250	310	330	330	360	360	365	365	360	360	360	360	360	360	360	360	360	360	360	360	360	360	
	U	260	250	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	
foFI	MED																								
	CAT																								
	LO																								
	U																								
foE	MED																								
	CAT																								
	LO																								
	U																								
h'E	MED																								
	CAT																								
	LO																								
	U																								
foE4	MED	29	31	58	24	38	26	27	30	55	57	50	50	50	57	50	43	47	41	41	41	36	29	31	28
	CAT	2	3	5	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	LO	29	31	58	24	38	26	27	30	55	57	50	50	50	50	57	50	43	47	41	41	36	29	31	28
	U																								

August, 1964)

[illegible]JULY, 1961

TABLE 40

[illegible]JULY, 1961

PART 1 - F2427		1488, IN.										TIME 1488													
HOUR		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
f6F2	MED	58	52	48	45	42	41	45	53	57	62	62	63	62	62	61	60	62	64	61	67	60			
	CNT	19	22	14	17	16	26	22	19	1	15	21	17	17	20	11	1	1	23	24	18	11	13	15	
	LO																								
f6F2	MED	335	358	345	362	345	345	338	362	348	450	350	338	340	315	300	260								
	CNT	5	10	16	18	18	18	24	25	18	18	18	27	24	19	21	17	8							
	LO																								
f6F	MED	250	250	255	280	290	255	255	260	282	245	222	218	200	215	220	230	230	232	240	240	260	250	250	265
	CNT	28	26	26	28	28	20	25	24	18	14	18	17	11	18	17	20	11	16	11	13	25	26	25	
	LO																								
M3000/F2	MED	278	282	278	280	280	290	260	290	285	300	310	308	300	298	300	305	298	305	305	315	320	305	295	
	CNT	14	16	12	15	25	27	23	18	18	16	21	15	16	18	18	22	24	20	22	22	18	9	11	
	LO																								
f6F1	MED	510	346	380	60	640	650	670	670	600	680	670	650	640	660	600									
	CNT	2	9	13	17	17	22	18	16	22	20	24	16	13	6	2									
	LO																								
f6E	MED	1	3	3	4	9	18	19	24	20	30	320	340	330	340	310	45	350	280	240	190	5			
	CNT																								
	LO																								
f6E	MED	1	3	3	4	9	20	8	26	26	27	24	20	22	19	21	24	26	25	27	5	5	1		
	CNT																								
	LO																								
f6Ea	MED	35	30	28	23	24	27	32	30	35	37	42	40	45	44	45	41	44	44	43	50	39	47	35	
	CNT	15	17	25	21	23	23	23	26	28	30	27	26	24	24	21	20	21	20	21	27	26	25	21	
	LO																								

JULY • 1961

hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	16	18	17	16	19	20	21	22	23
f6F2	MED CNT LO	39 24	36 27	34 25	28 20	29 20	36 24	65 39	77 51	87 51	76 31	71 31	95 31	93 31	96 30	80 27	75 25	93 27	69 26	82 30	63 25	63 25	61 30	39 29
f2F2	MED CNT LO	400	440	1	1				250	250	450	230	270	270	260	460	250							
f2F2	MED CNT LO								7	26	31	31	27	30	24	18	7							
f2F	MED CNT LO	270	260	250	230	250	260	245	230	220	210	200	200	200	200	200	240	230	210	230	250	250	260	260
f2F	MED CNT LO	29	30	30	32	30	30	30	39	11	31	31	31	31	31	31	31	31	31	31	31	30	30	29
M3000F2	MED CNT LO	295	295	335	365	210	350	225	365	355	360	330	365	330	360	365	365	360	330	315	300	300	295	295
M3000F2	MED CNT LO	284	277	277	259	228	330	229	330	31	31	31	31	31	31	30	28	27	25	27	25	30	28	29
f6F1	MED CNT					120				450	450	460	460	470	430	470								
f6F1	MED CNT					1				2	13	24	11	19	6	1								
f6E	MED	E	E	E	E	E	100	230	270	300	330	330	340	330	310	305	265	170	E	E	E	E	E	E
f6E	MED	4	4	7	4	6	14	24	28	27	23	22	21	19	10	9	18	9	2	4	7	4	4	3
f6E	MED	E	E	E	E	E	E	110	100	100	100	100	100	100	100	100	100	100	E	E	E	E	E	E
f6E	MED	4	5	7	4	6	14	25	30	31	31	31	31	31	31	28	11	2	6	7	4	4	5	5
f6Ea	MED	2	18	25	27	33	26	15	16	15	15	12	12	39	40	40	40	36	35	32	29	25	23	24
f6Ea	MED	29	30	30	35	30	30	30	19	41	310	33	31	31	31	31	31	31	31	31	31	30	30	30

JULY • 1961

TABLE 50

JULIUSBURG/RUGEN, GERMANY													15th-19th, 13th-14th				TIME 15:00									
HOUR		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
f6	MED	58	55	53	49	50	53	56	60	61	64	64	64	64	64	64	62	63	61	62	65	66	68	70	70	63
	LO	29	28	29	27	28	29	29	27	28	29	29	28	29	29	29	29	28	30	30	29	30	30	30	30	27
	LO																									
n'F	MED					390	380	405	385	340	345	340	345	350	360	350	365	340	350	320	305	315				
	LO					1	3	12	15	17	24	22	24	24	28	27	26	21	20	16	8	4				
	LO																									
n'F	MED	280	270	270	290	290	245	230	225	220	215	210	210	210	210	210	210	220	220	225	240	250	260	260	260	267
	LO	27	28	27	26	27	32	21	17	14	9	9	8	10	15	18	18	16	14	10	10	21	24	26	27	
	LO																									
M30000IF2	MED	280	285	285	285	285	280	290	285	295	290	290	285	285	290	290	290	285	290	300	295	300	295	290	285	
	LO	27	27	26	26	28	29	28	27	28	27	27	27	29	29	27	28	30	29	29	30	30	30	30	26	
	LO																									
f6 F1	MED					160	270	350	400	420	440	450	470	480	480	470	470	460	450	430	390					
	LO					1	3	11	16	19	26	22	20	18	25	27	22	17	11	3						
	LO																									
f6	MED																									
	LO																									
	LO																									
n'E	MED																									
	LO																									
	LO																									
f6 E1	MED	30	17	13	15	20	26	33	35	37	41	43	46	43	40	37	39	40	39	40	33	26	27	29	21	
	LO	8	20	26	25	26	28	26	25	24	290	29	29	26	24	27	25	28	27	29	27	17	14	10		
	LO																									

TABLE 52

[illegible]

TABLE 49

[illegible]

TABLE 51

[illegible]

SWEEP 0.5 MC TO 20.0 MC IN 25 SECONDS.

JULY, 1961

SWEEP 1.3 M- TO 1A-0 MC IN 30 SECONDS.

SWEEP 1.4 MC TO 17.0 MC.

1043

6
6
9
1
8
2
4
2
2
6
4
5
6
9
2
6
7
6
1

TABLE 59
240 PAULG, BRAZIL
(22.55S, 46.5W)
WHITE SANDS, NEW MEXICO
(32.28N, 106.5W)

TIME 05-04	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
fF2	54	56	50	44	32	28	29	27	22	20	18	16	14	12	10	9	8	7	6	5	4	3	2	1
h'F2	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
h'F	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
M3000F2	330	350	315	350	340	310	320	355	360	340	340	350	325	320	320	320	330	345	360	350	325	330	345	345
fF1	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
fE	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h'E	107	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
fEs	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

*SWEEP 1.0 MC TO 25.0 MC.

MAY, 1961

TABLE 60
240 PAULG, BRAZIL
(22.55S, 46.5W)
WHITE SANDS, NEW MEXICO
(32.28N, 106.5W)

TIME 105-04	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
fF2	42	41	40	39	37	36	40	57	67	75	83	94	99	101	96	91	84	80	75	63	52	44	46	45
h'F2	27	30	30	29	28	26	30	30	31	30	30	30	30	30	30	30	30	30	30	30	29	30	27	25
h'F	27	30	30	29	28	26	30	30	31	30	30	30	30	30	30	30	30	30	30	30	29	30	27	25
M3000F2	260	280	285	270	280	280	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290
fF1	260	280	285	270	280	280	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290
fE	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h'E	117	110	107	105	106	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
fEs	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

*SWEEP 1.0 MC TO 25.0 MC IN 27 SECONDS.

MARCH, 1961

TABLE 72
LEOPOLDVILLE, CONGO
(4.45S, 15.2E)

TIME 135-05	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
fF2	56	59	51	42	30	40	68	80	85	96	105	115	130	137	140	138	136	137	130	141	128	130	114	82
h'F2	12	17	23	21	21	26	23	25	25	18	18	23	24	23	27	25	25	16	6	5	5	6	11	11
h'F	12	17	23	21	21	26	23	25	25	18	18	23	24	23	27	25	25	16	6	5	5	6	11	11
M3000F2	278	278	287	304	315	303	312	294	273	254	241	239	235	241	243	245	252	262	267	281	284	282	286	293
fF1	278	278	287	304	315	303	312	294	273	254	241	239	235	241	243	245	252	262	267	281	284	282	286	293
fE	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
h'E	120	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
fEs	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

*SWEEP 1.0 MC TO 25.0 MC IN 27 SECONDS.

MARCH, 1961

TABLE 72
LEOPOLDVILLE, CONGO
(4.45S, 15.2E)

TIME 0-0	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
fF2	56	59	51	42	30	40	68	80	85	96	105	115	130	137	140	138	136	137	130	141	128	130	114	82
h'F2	12	17	23	21	21	26	23	25	25	18	18	23	24	23	27	25	25	16	6	5	5	6	11	11
h'F	12	17	23	21	21	26	23	25	25	18	18	23	24	23	27	25	25	16	6	5	5	6	11	11
M3000F2	278	278	287	304	315	303	312	294	273	254	241	239	235	241	243	245	252	262	267	281	284	282	286	293
fF1	278	278	287	304	315	303	312	294	273	254	241	239	235	241	243	245	252	262	267	281	284	282	286	293
fE	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
h'E	120	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
fEs	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

*SWEEP 1.0 MC TO 25.0 MC IN 27 SECONDS.

MARCH, 1961

TABLE 78

LEOPOLDOVILLE, CONGO

1 4.45, 15.2E

TIME 0-0

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
f ₀ F2	MEQ CNT UQ LO	72 84 11	84 76 14	65 65 17	62 23 21	62 24 20	81 20 18	88 315 22	125 18	130 22	139 23	144 25	145 22	146 22	145 25	144 23	146 19	145 12	143 5	141 5	141 5	150 5	125 5	85 13
f ₀ F2	MEQ CNT UQ LO																							
f ₀ F	MEQ CNT UQ LO																							
M3000IF2	MEQ CNT UQ LO	255 10	269 12	269 17	299 21	299 23	296 18	275 16	244 18	237 22	241 23	230 25	230 22	241 22	242 25	243 23	245 19	250 12	256 5	265 5	272 5	285 5	279 5	267 11
f ₀ F1	MEQ CNT								1	2	1	1												
f ₀ E	MEQ CNT								U 200	270 8	320 16	360 17	390 9	3	2	7	4	10	7	5				
f ₀ E	MEQ CNT								U 135	115 16	110 6	110 14	110 13	110 20	110 12	110 13	110 18	110 24	110 20	110 5				
f ₀ Ea	MEQ CNT																							

SWEEP 1.0 MC TO 20.0 MC IN 7 SECONDS.

OCTOBER, 1960

TABLE 77

BUNIA, CONGO

1 1.5N, 30.2E

TIME 0-0

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
f ₀ F2	MEQ CNT UQ LO	60 6	6 4	2 4	4 5	4 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
f ₀ F2	MEQ CNT UQ LO																							
f ₀ F	MEQ CNT UQ LO																							
M3000IF2	MEQ CNT UQ LO	262 6	262 4	262 2	262 4	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6	262 6
f ₀ F1	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ Ea	MEQ CNT																							

SWEEP 1.0 MC TO 20.0 MC IN 7 SECONDS.

OCTOBER, 1960

TABLE 79

BUNIA, CONGO

1 1.5N, 30.2E

TIME 0-0

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
f ₀ F2	MEQ CNT UQ LO	2 3	3 5	5 5	5 5	15 22	28 28	27 25	22 18	137 137	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140	140 140
f ₀ F2	MEQ CNT UQ LO																							
f ₀ F	MEQ CNT UQ LO																							
M3000IF2	MEQ CNT UQ LO	2 3	300 312	312 5	305 4	295 15	268 22	254 27	240 25	230 22	230 18	230 18	230 21	230 21	230 21	230 21	230 21	230 21	230 21	230 21	230 21	230 21	230 21	230 21
f ₀ F1	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ Ea	MEQ CNT																							

SWEEP 1.0 MC TO 20.0 MC IN 7 SECONDS.

SEPTEMBER, 1960

TABLE 80

LEOPOLDOVILLE, CONGO

1 4.45, 15.2E

TIME 0-0

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
f ₀ F2	MEQ CNT UQ LO	3 5 5 5	U 67 54 60	U 50 62 90	110 50 62 90	110 110 110 110	113 120 124 130	135 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140	140 140 140 140
f ₀ F2	MEQ CNT UQ LO																							
f ₀ F	MEQ CNT UQ LO																							
M3000IF2	MEQ CNT UQ LO	3 5 5 5	U 276 268 293	U 305 302 302	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285	285 285 285
f ₀ F1	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ E	MEQ CNT																							
f ₀ Ea	MEQ CNT																							

SWEEP 1.0 MC TO 20.0 MC IN 7 SECONDS.

SEPTEMBER, 1960

TABLE 62

132.51 6.50 15.251

EPOLOVILLE • CON. 2

[illegible]

AUGUST, 1960

TABLE 84

14.45, 15.2E)

LEPOPOVILJE, CONQ

[illegible]

0961 • A 1117

[illegible]

AUGUST, 1960

TABLE 12

[illegible]

TABLE 8*

CAPE HALLETT, ANTARCTICA																							TIME 165.0E				
HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
f6F2 MED CNT UQ LO	39 20	35 17	30 14	33 11	37 19	31 12	43 15	45 11	45 16	51 15	55 15	54 19	56 23	56 25	59 23	60 25	58 27	58 24	58 26	58 26	58 24	58 24	58 24	58 24			
h'F2 MED CNT UQ LO																											
h'F MED CNT UQ LO																											
M3000F2 MED CNT UQ LO	28J 18	285 11	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12	285 12			
f6FI MED CNT																											
f6E MED CNT																											
h'E MED CNT																											
f6E*	17 28	23 26	23 27	23 27	23 27	23 27	23 27	23 27	27 26	26 31	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32	26 32			

JUNE* 1960

SWEET 1.0 MC TO 25.0 MC IN 13.5 SECONDS.

TABLE 8b

CAPE HALLETT, ANTARCTICA 172.35, 170.2E																							TIME 165.0E				
HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
f6 F2 MED CNT UQ LO	41 20	34 19	38 14	32 14	38 11	33 08	35 11	46 08	45 11	43 06	63 12	59 12	67 12	65 12	62 23	66 24	66 24	65 24	64 24	65 24	63 24	63 24	63 24	63 24			
h' F2 MED CNT UQ LO																											
h' F MED CNT UQ LO																											
M3000F2 MED CNT UQ LO	285 18	285 15	285 15	275 10	285 10	302 8	310 7	270 7	292 6	300 11	288 10	305 11	300 13	285 14	295 18	290 19	282 18	280 20	290 21	290 19	280 19	280 19	295 17	285 19			
f6 FI MED CNT																											
f6 E MED CNT																											
h' E MED CNT																											
f6 EX MED CNT UQ LO	16 27	18 26	18 27	25 27	30 28	26 26	22 28	25 27	32 26	35 27	36 27	31 25	U 12	J 26	U 28	J 28	J 28	U 27	U 28	U 28	U 28	U 28	U 28	U 28			

MAY* 1960

SWEET 1.0 MC TO 25.0 MC IN 13.5 SECONDS.

TABLE 87

CAPE HALLETT, ANTARCTICA 172.35, 170.2E																								TIME 165.0E			
HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
f6F2 MED CNT UQ LO	39 13	37 11	29 11	48 17	27 20	30 16	48 22	57 22	70 21	75 19	73 18	71 15	72 14	68 13	72 13	72 13	70 13	77 13	75 13	76 13	76 13	76 13	76 13	76 13			
h'F2 MED CNT UQ LO																											
h'F MED CNT UQ LO																											
M3000F2 MED CNT UQ LO	270 10	240 03	270 05	285 05	260 05	270 05	285 05	270 05	295 00	300 12	295 13	288 12	305 13	290 13	285 12	260 12	290 19	275 19	280 17	272 18	265 9	262 14	260 12	255 10			
f6FI MED CNT																											
f6E MED CNT																											
N'E MED CNT																											
f6E*	19 27	23 24	30 22	34 22	25 21	24 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21	25 21			

APRIL* 1960

SWEET 1.0 MC TO 25.0 MC IN 13.5 SECONDS.

TABLE 88

CAPE HALLETT, ANTARCTICA 172.35, 170.2E1																							TIME 165.0E				
HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
f6F2 MED CNT UQ LO	34 15	37 18	35 14	35 13	40 11	40 10	53 15	65 14	72 13	72 13	70 13	70 13	66 15	67 22	68 24	71 24	70 24	72 24	77 24	70 24	68 24	71 24	51 24	49 24			
h'F2 MED CNT UQ LO																											
h'F MED CNT UQ LO																											
M3000F2 MED CNT UQ LO	250 12	265 11	245 11	275 12	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09	285 09			
f6FI MED CNT																											
f6E MED CNT																											
h'E MED CNT																											
f6E*	20 29	24 30	35 30	35 31	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29	30 29			

MARCH* 1960

SWEET 1.0 MC TO 25.0 MC IN 13.5 SECONDS.

TABLE 90

MAHFOBARAD, INDIA (23.0N, 72.6E)

[illegible]

FEB APR, 1960

TABLE 92
OMGAY, INDIA
(19.0N, 77.4E)

[illegible]

FEBRUARY, 1967

TABLE 90

INDIA 1977-78

[illegible]

FEBRUARY 1960

[illegible][illegible]

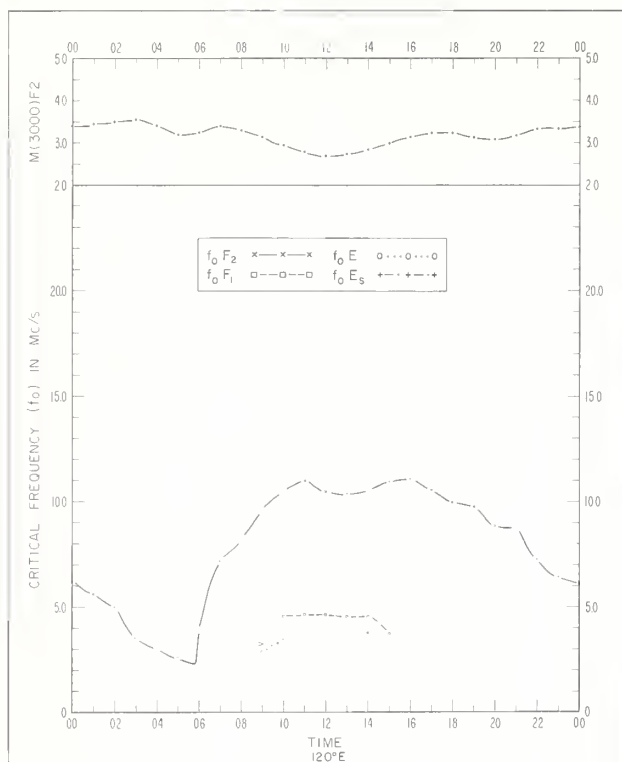
[illegible]

—ESS 2.5 MC TO 20.0 MC IN 5 MINUTES. MANUAL. FEBRUARY, 1960

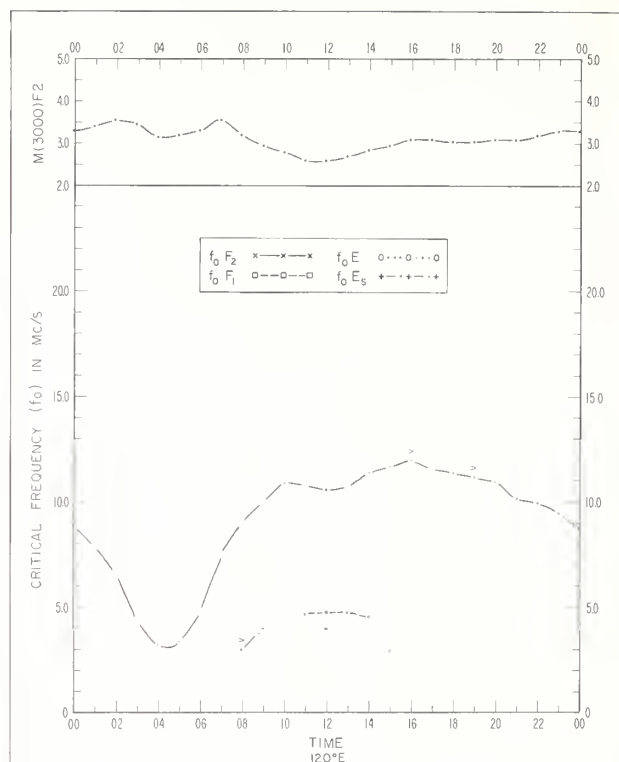
[illegible]

SWEEP 1.0 MC TO 25.0 MC IN 27 SECONDS.

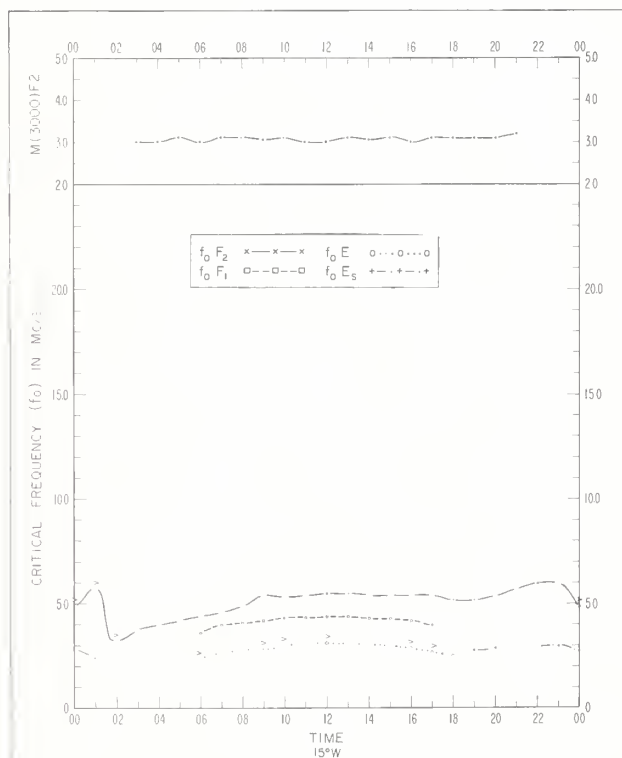
SWEEP 2.5 MC TO 20.0 MC IN 5 MINUTES • MANUAL •



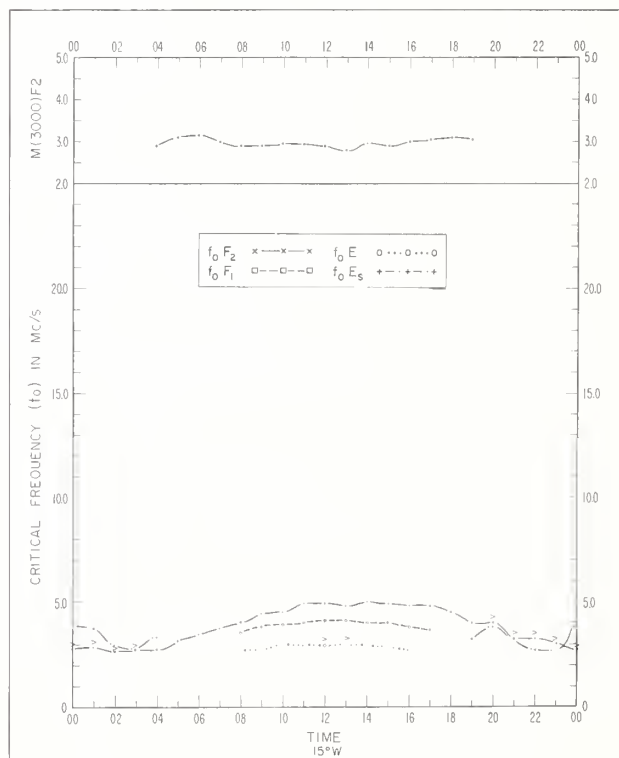
NOVEMBER 1962



OCTOBER 1962



MAY 1962



APRIL 1962

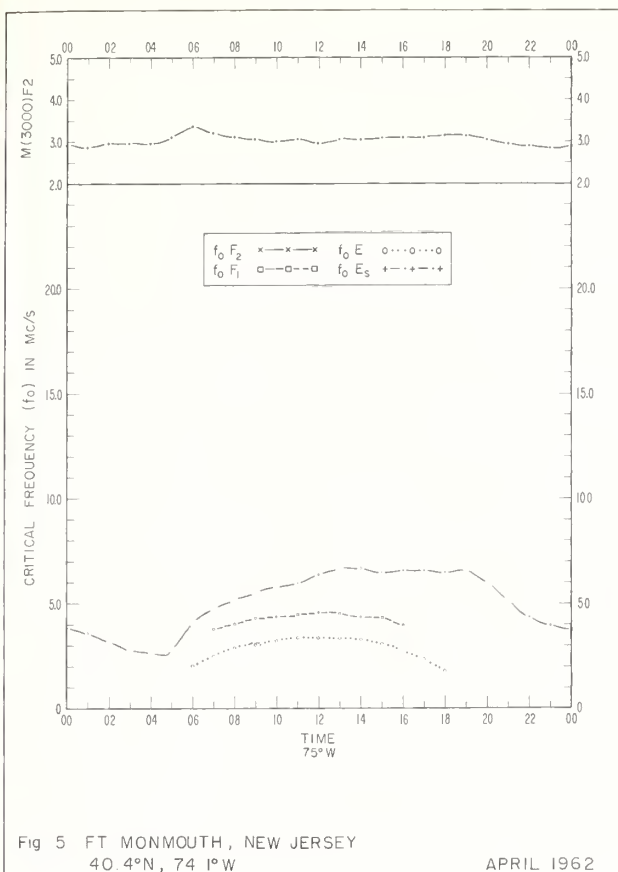


Fig 5 FT MONMOUTH, NEW JERSEY
40.4°N, 74.1°W

APRIL 1962

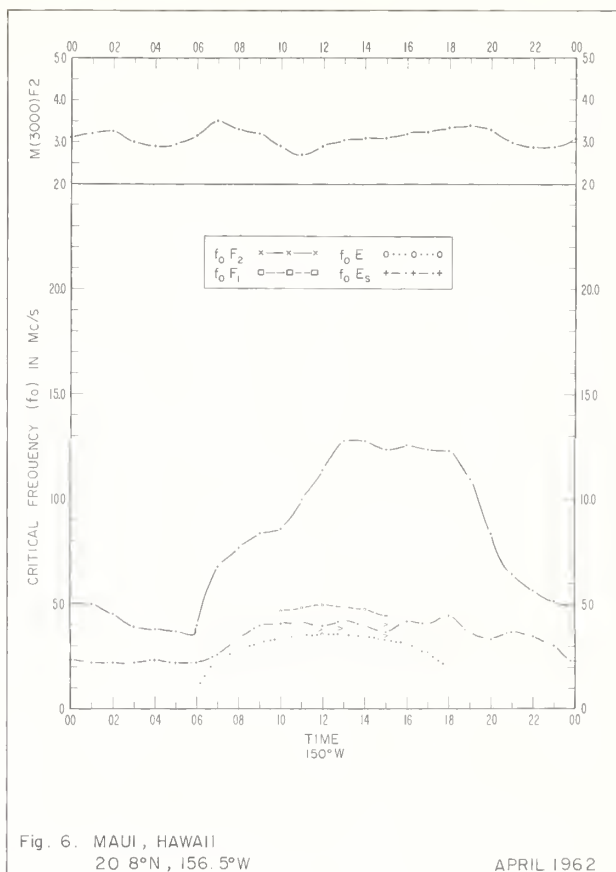


Fig. 6. MAUI, HAWAII
20.8°N, 156.5°W

APRIL 1962

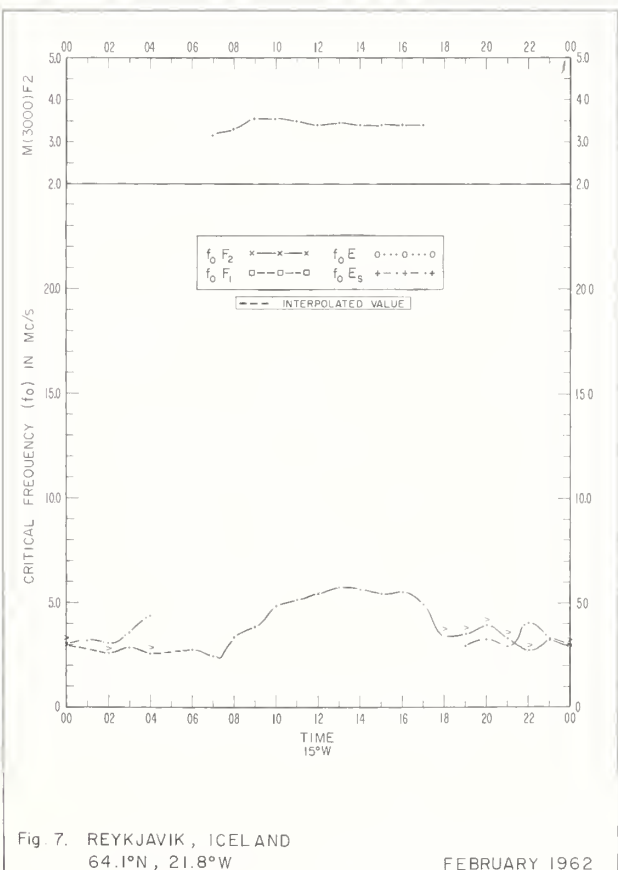


Fig. 7. REYKJAVIK, ICELAND
64.1°N, 21.8°W

FEBRUARY 1962

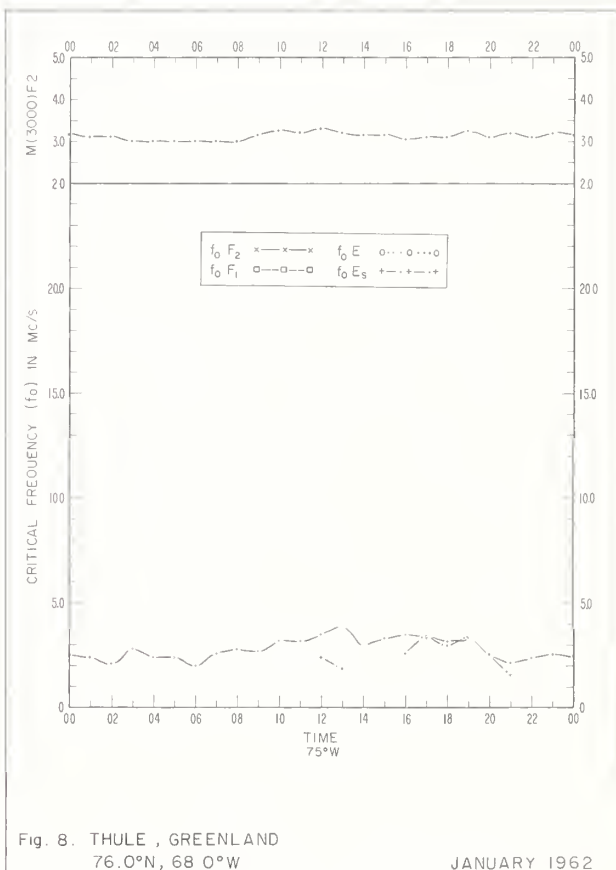
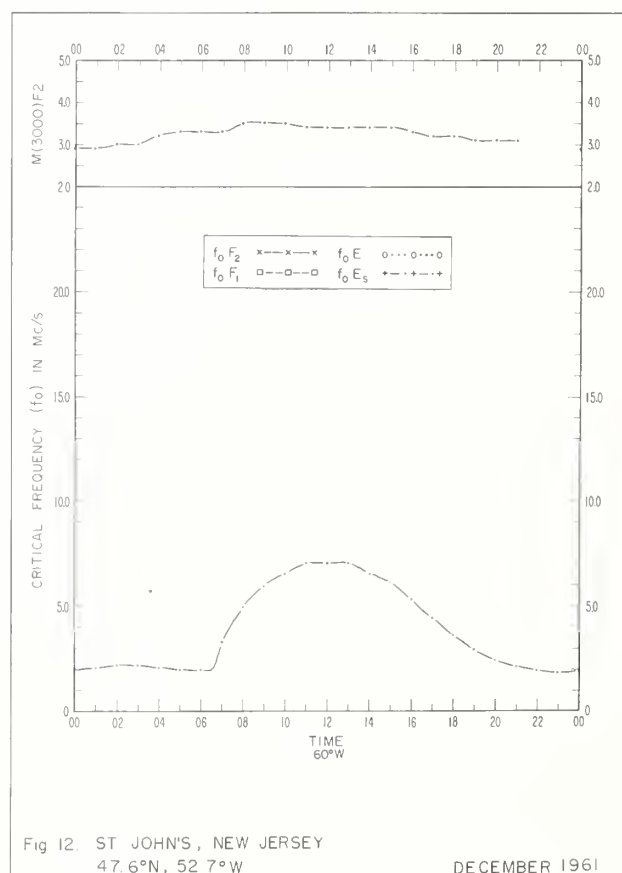
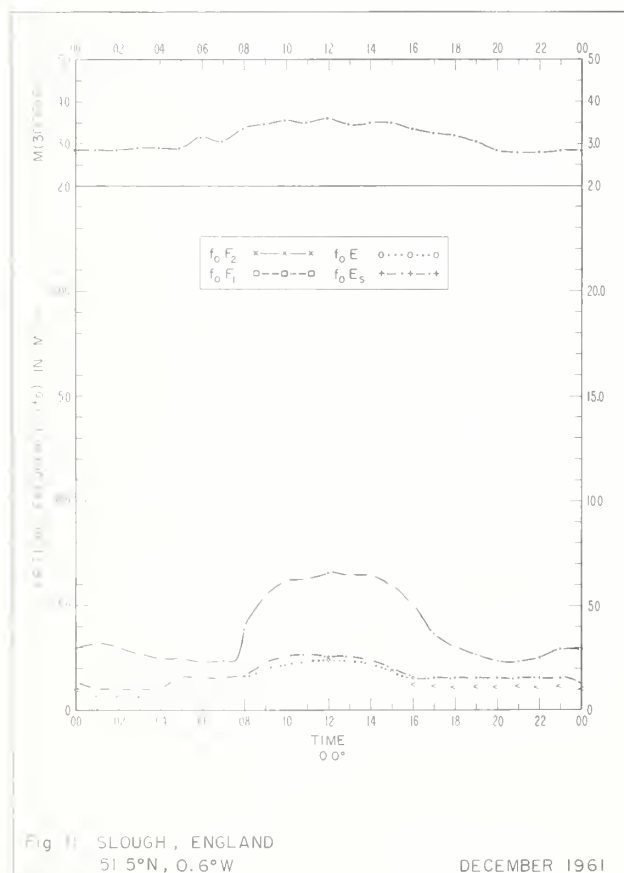
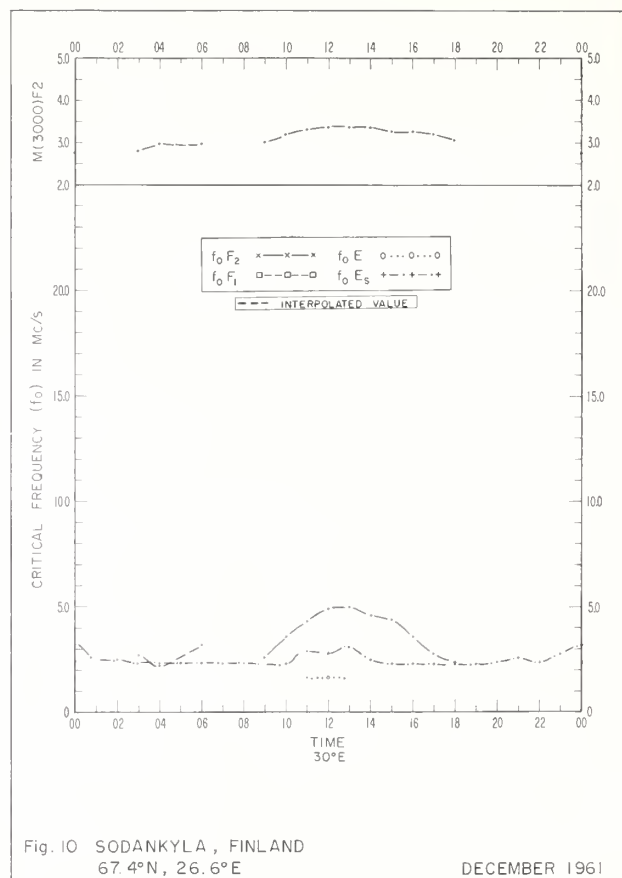
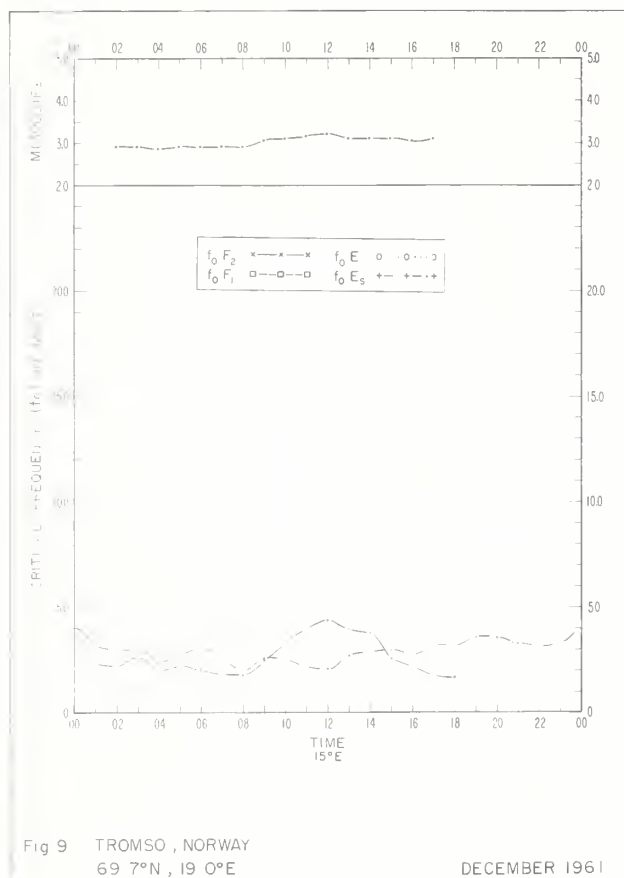
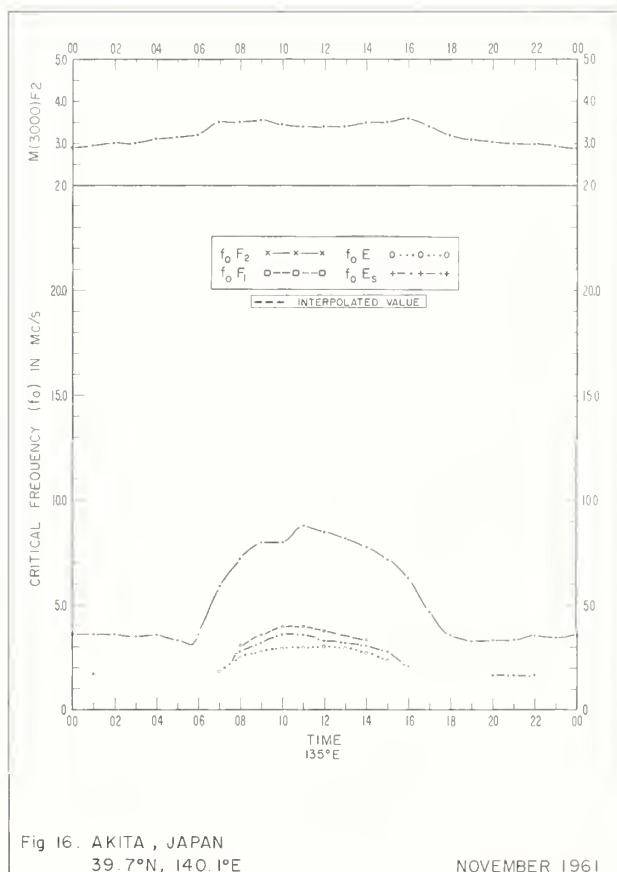
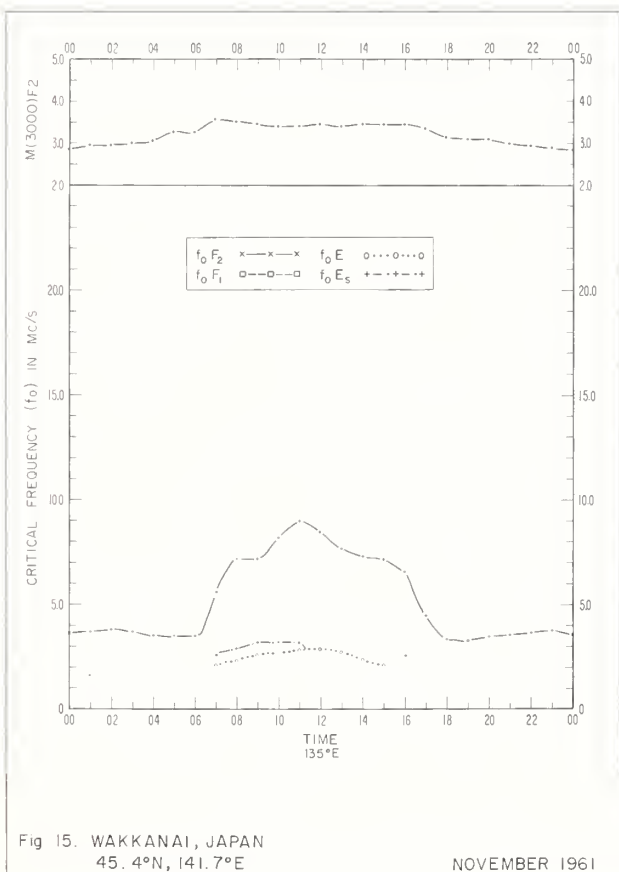
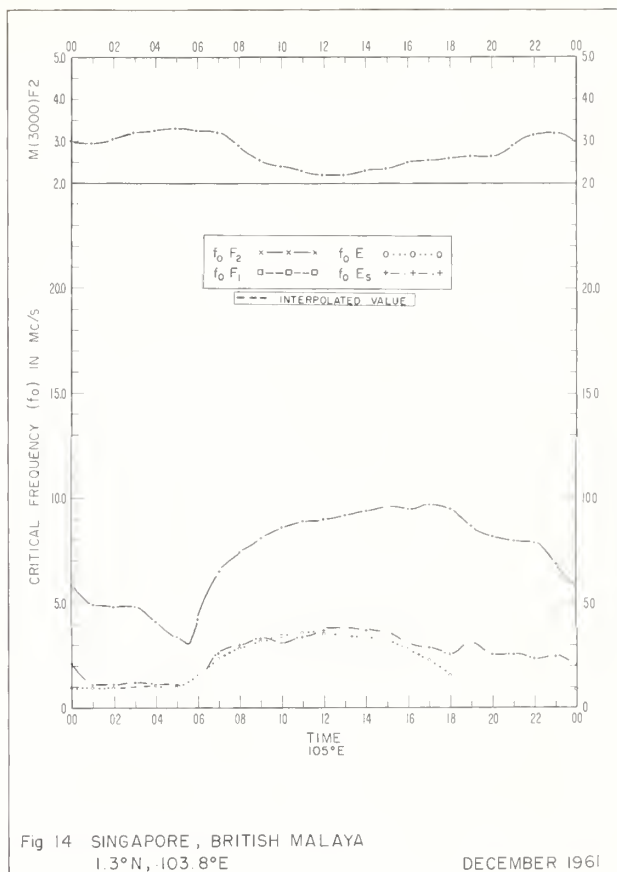
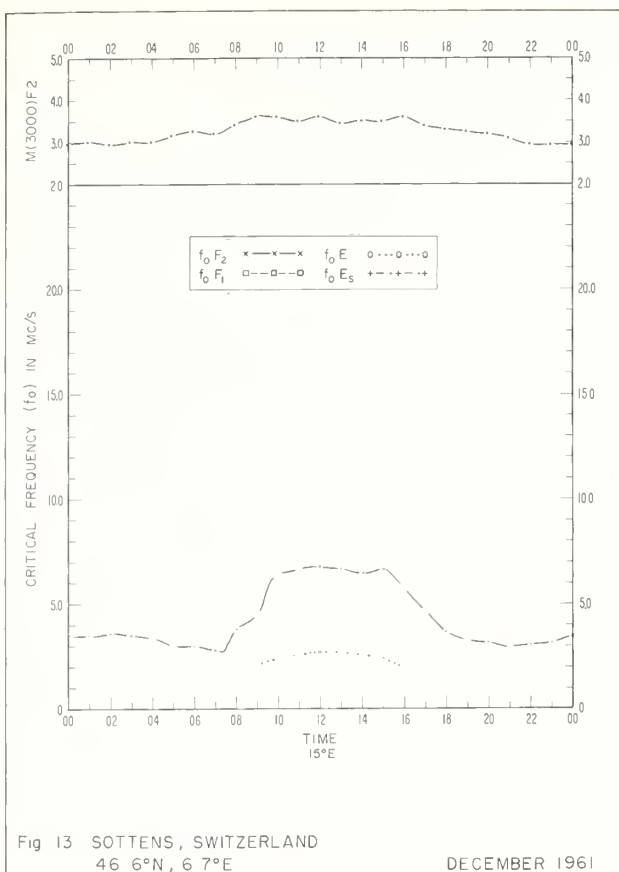
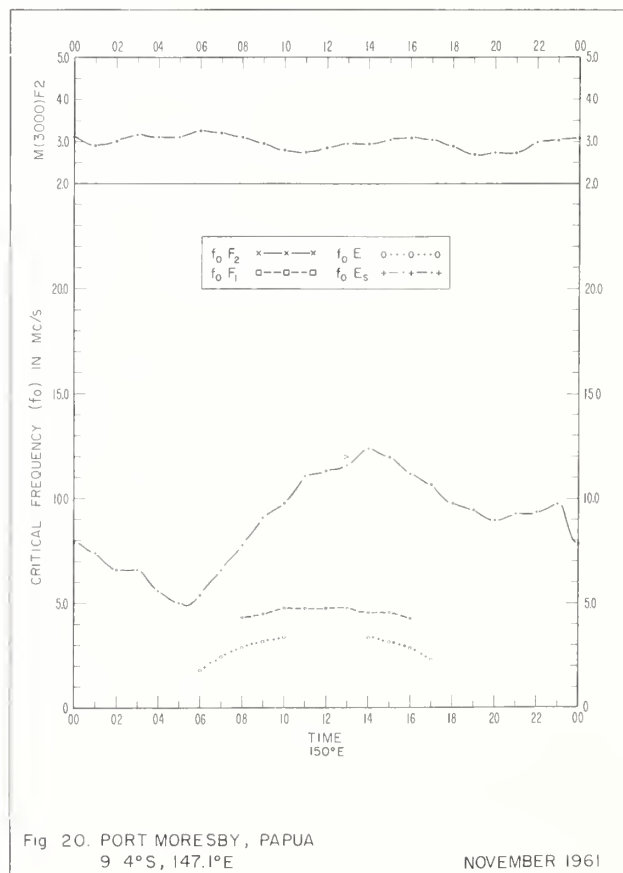
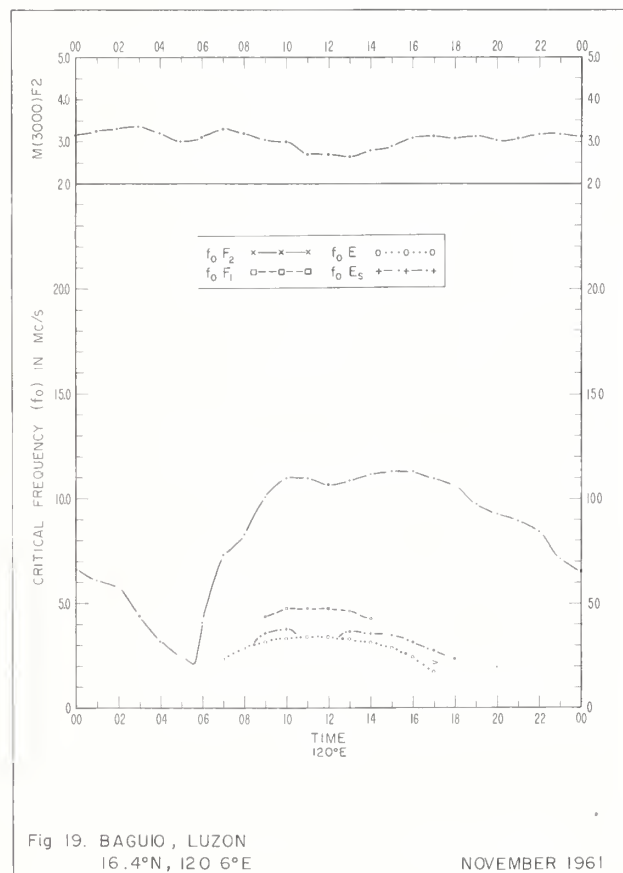
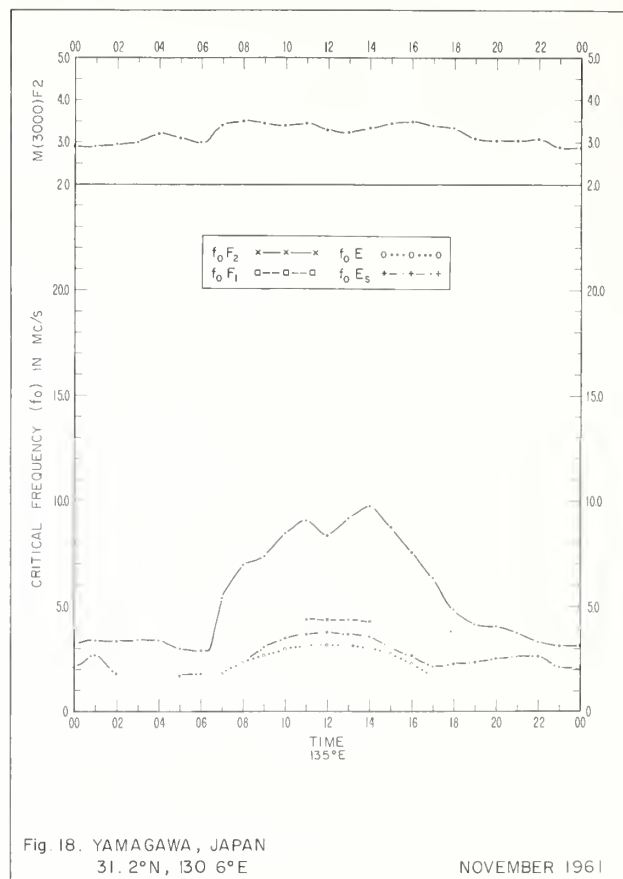
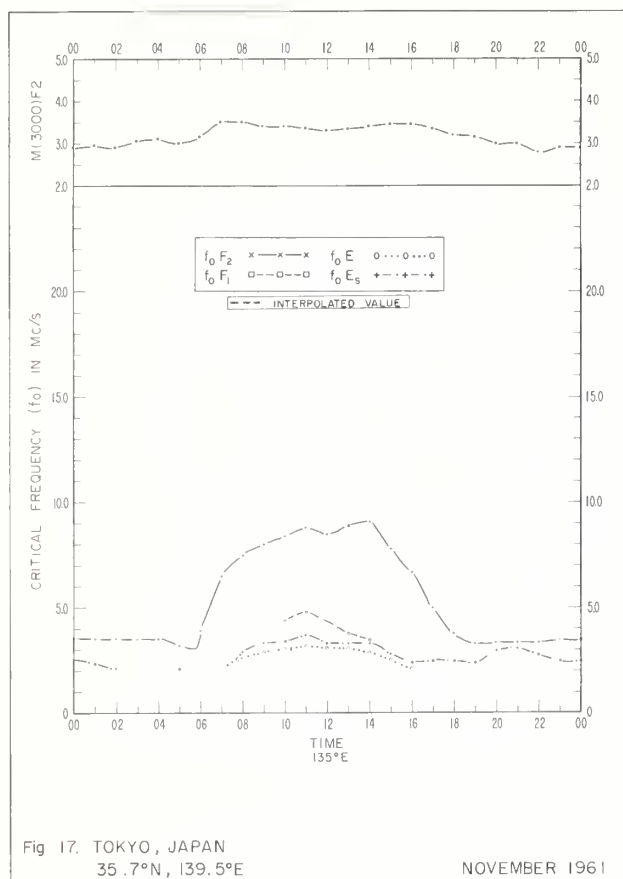


Fig. 8. THULE, GREENLAND
76.0°N, 68.0°W

JANUARY 1962







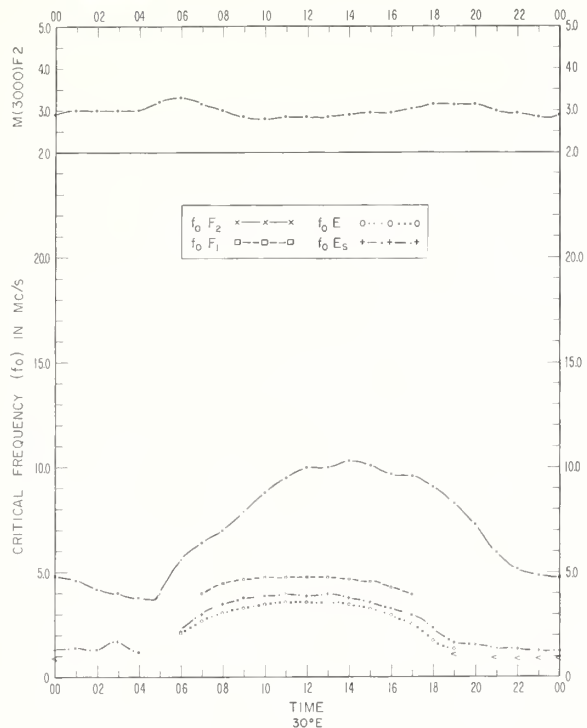


Fig. 21. JOHANNESBURG, UNION OF S AFRICA
26.1°S, 28.1°E

NOVEMBER 1961

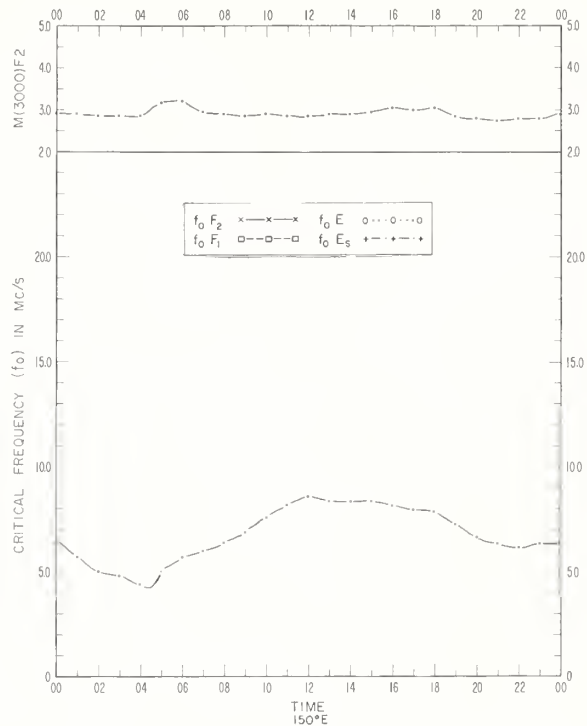


Fig. 22. BRISBANE, AUSTRALIA
27.5°S, 152.9°E

NOVEMBER 1961

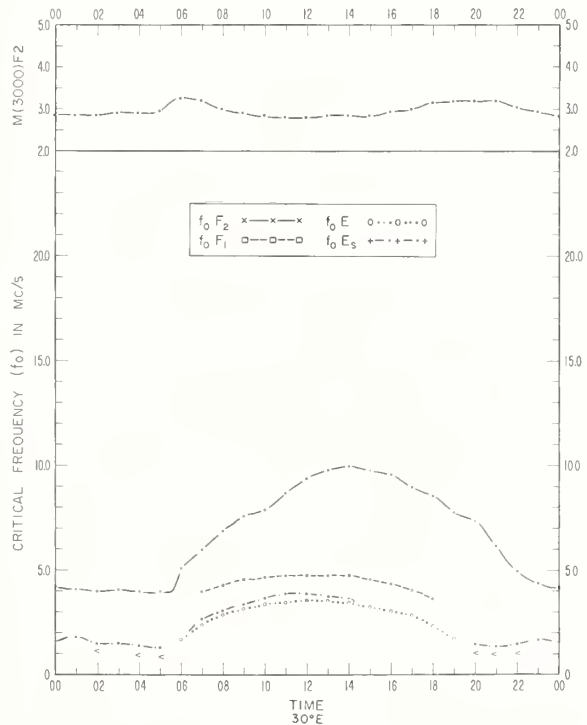


Fig. 23. CAPETOWN, UNION OF S AFRICA
34.1°S, 18.3°E

NOVEMBER 1961

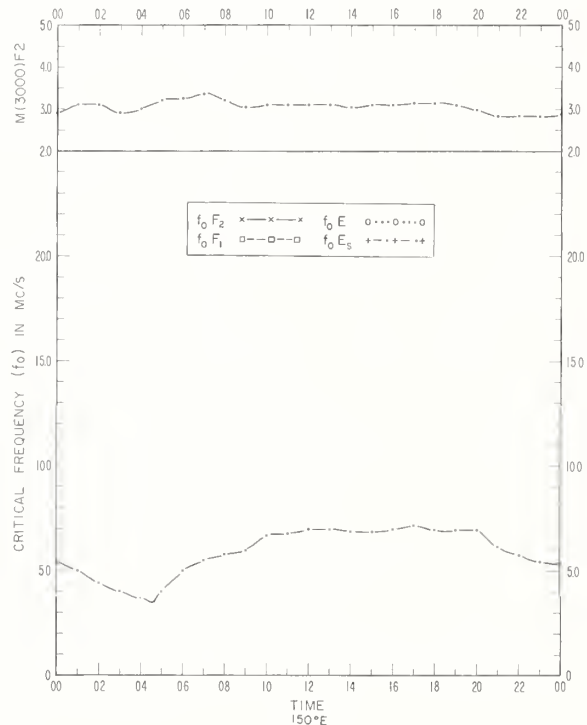


Fig. 24. CANBERRA, AUSTRALIA
35.3°S, 149.0°E

NOVEMBER 1961

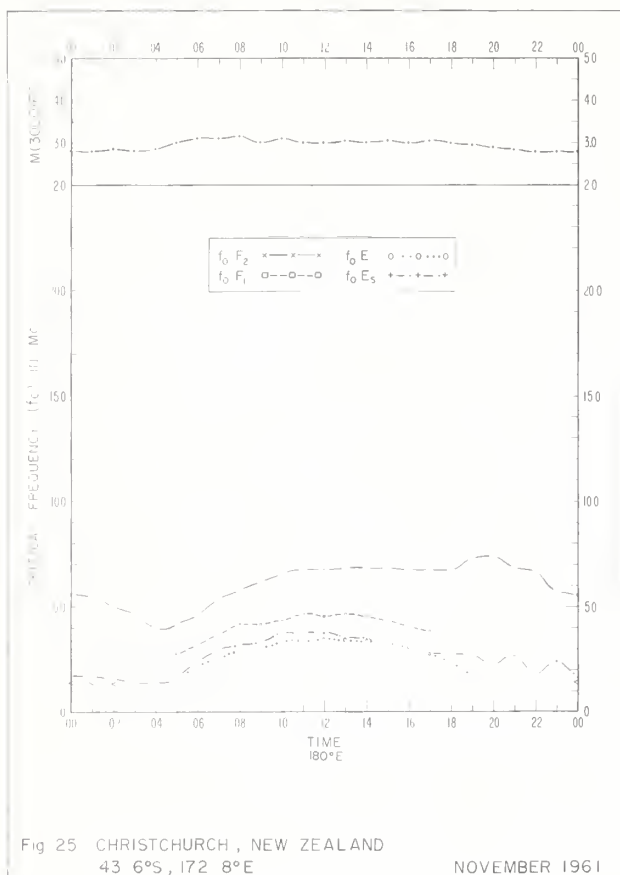


Fig 25 CHRISTCHURCH, NEW ZEALAND
43° 6'S, 172° 8'E

NOVEMBER 1961

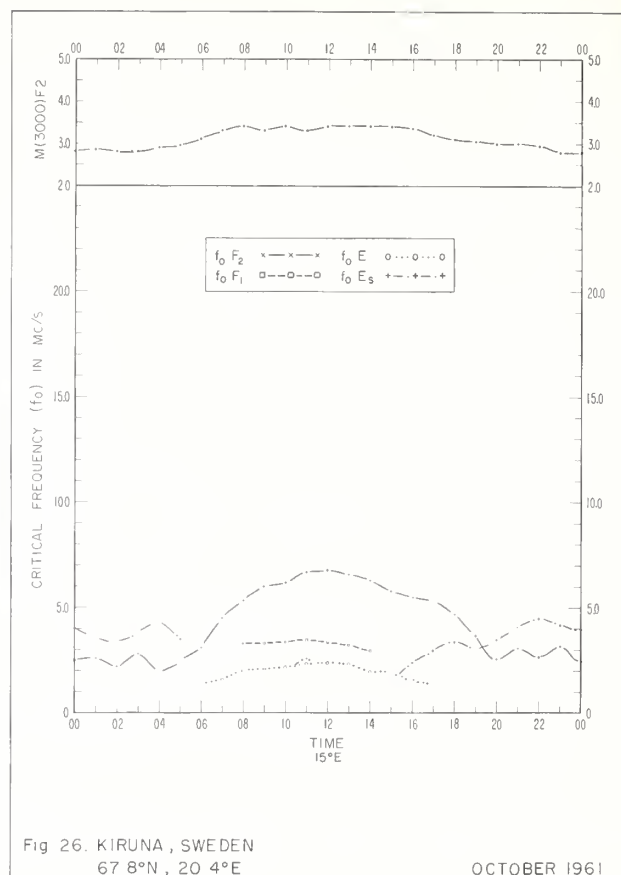


Fig 26. KIRUNA, SWEDEN
67° 8'N, 20° 4'E

OCTOBER 1961

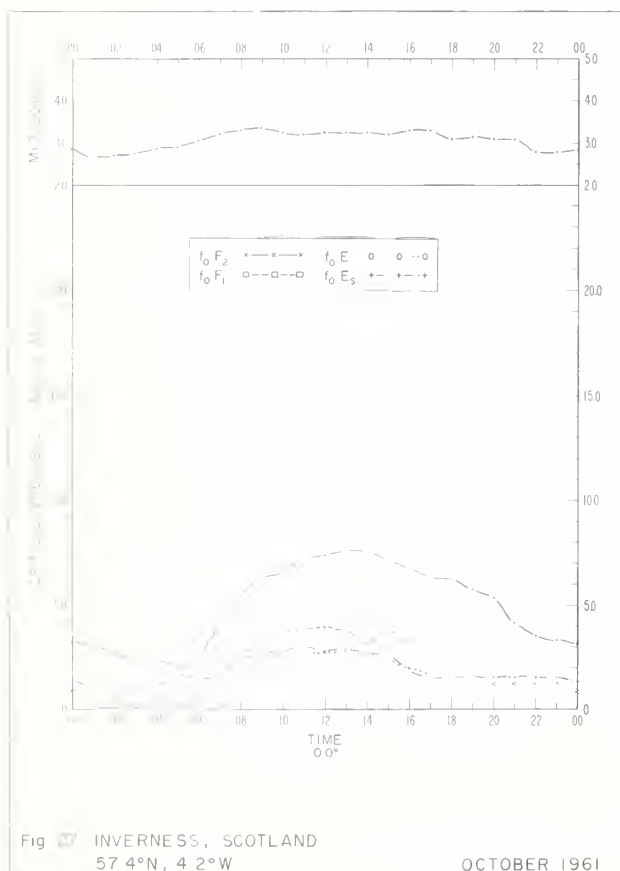


Fig 27 INVERNESS, SCOTLAND
57° 4'N, 4° 2'W

OCTOBER 1961

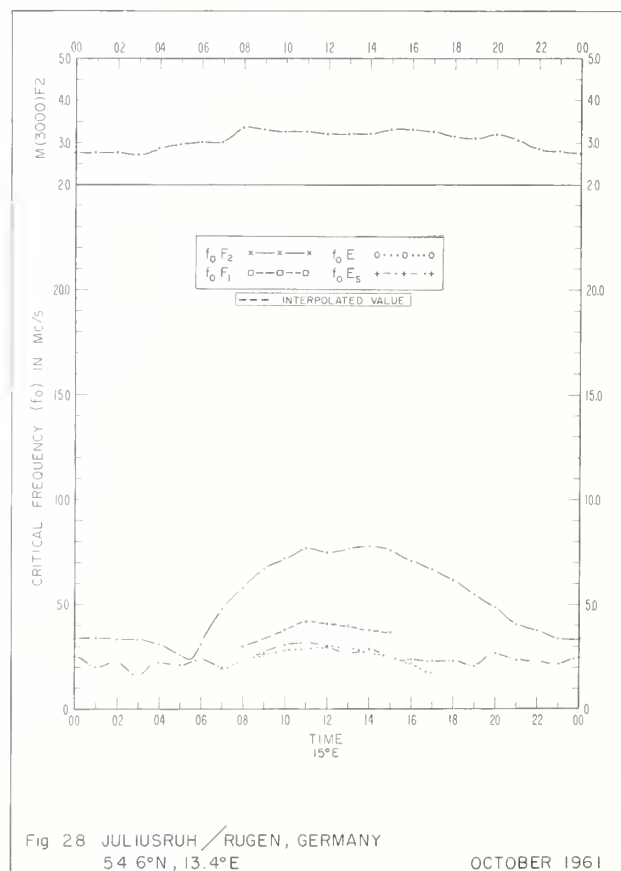


Fig 28 JULIUSRUH/RÜGEN, GERMANY
54° 6'N, 13.4°E

OCTOBER 1961

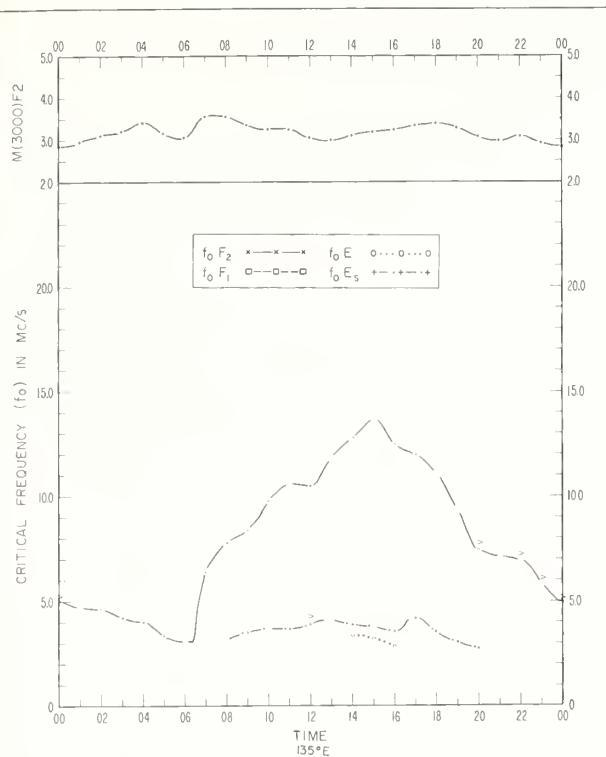


Fig 29. OKINAWA I
26.3°N, 127.8°E

OCTOBER 1961

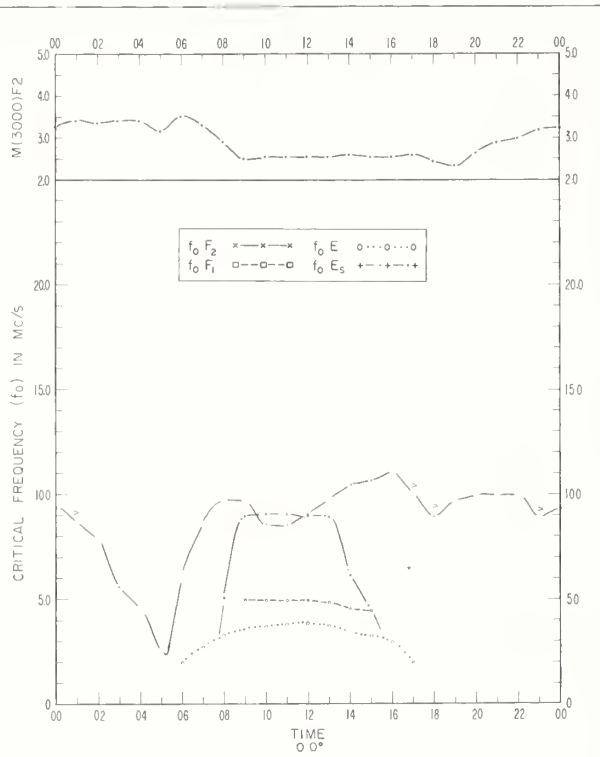


Fig 30. IBADAN, NIGERIA
7.4°N, 3.9°E

OCTOBER 1961

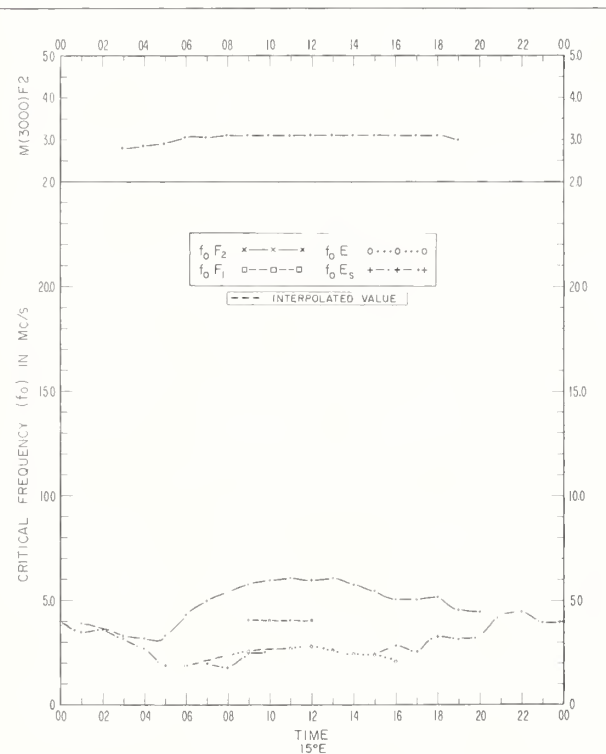


Fig. 31. TROMSO, NORWAY
69.7°N, 19.0°E

SEPTEMBER 1961

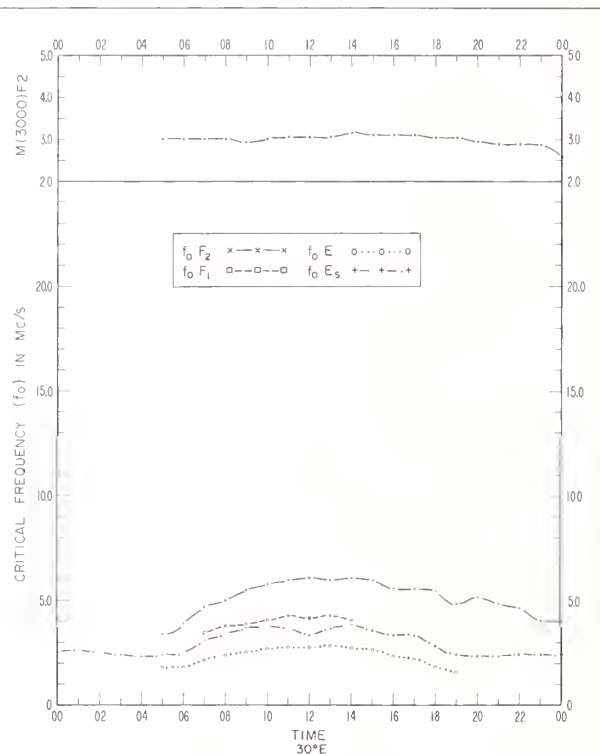
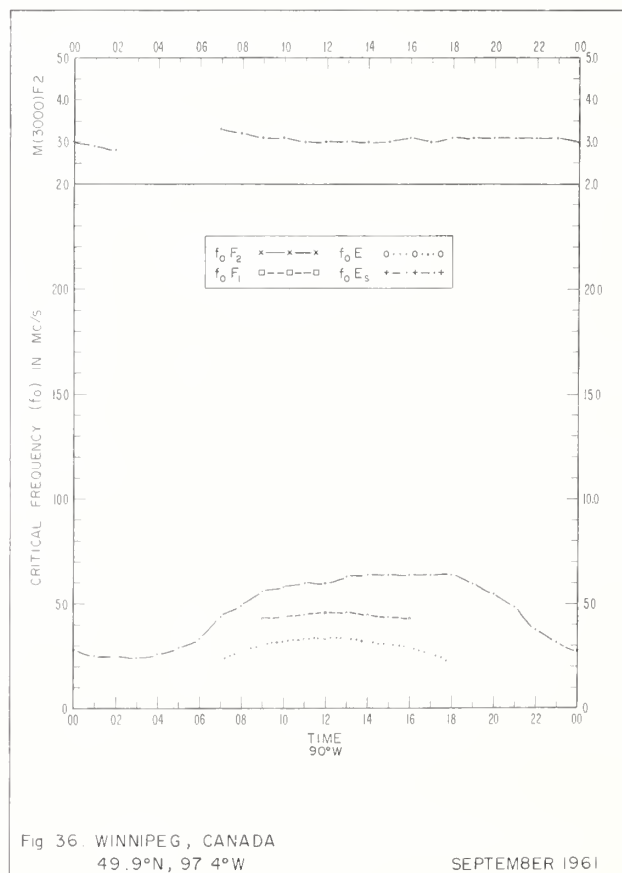
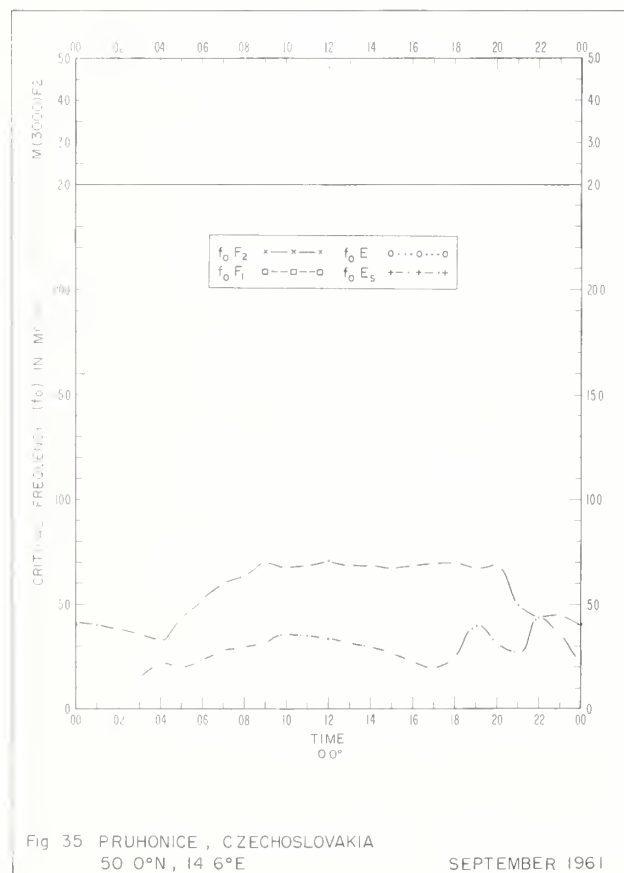
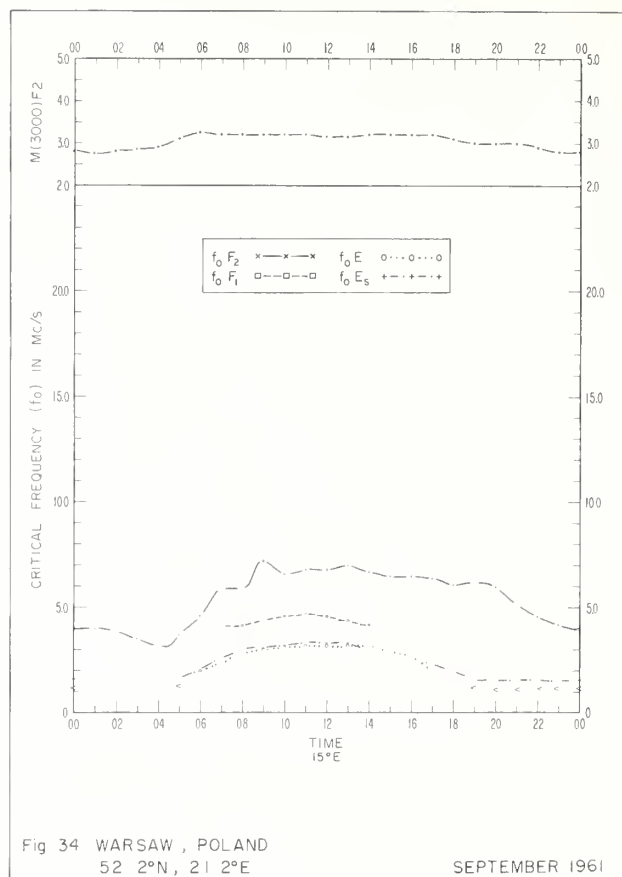
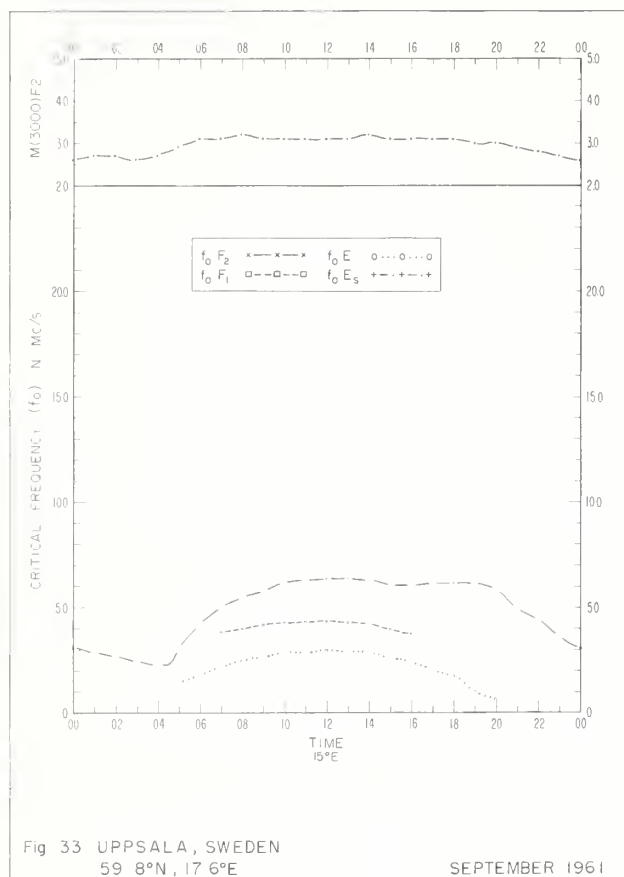
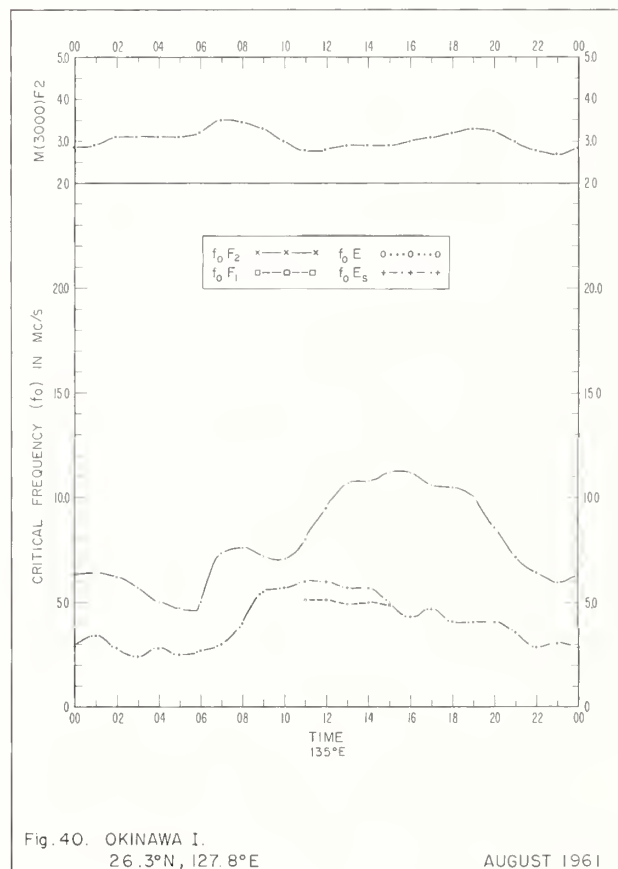
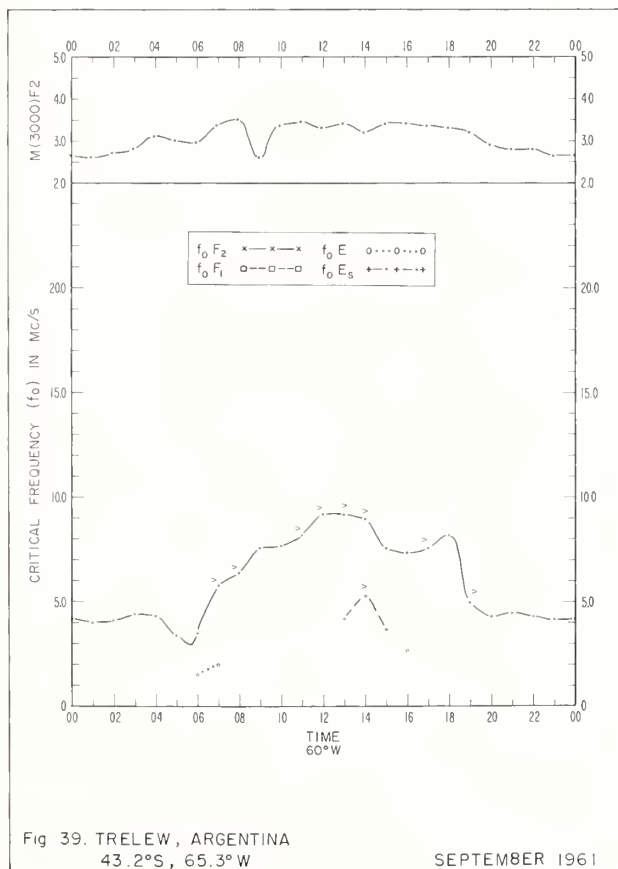
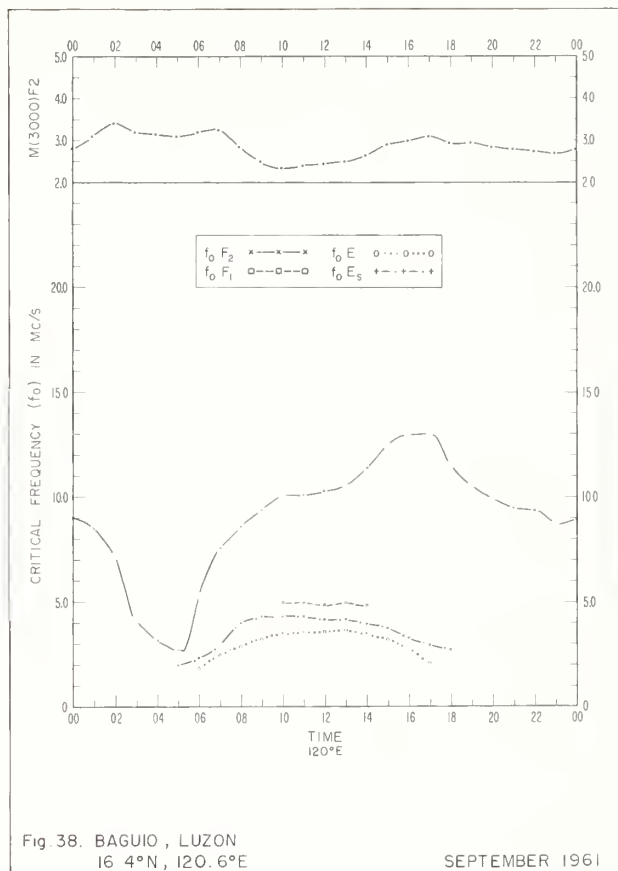
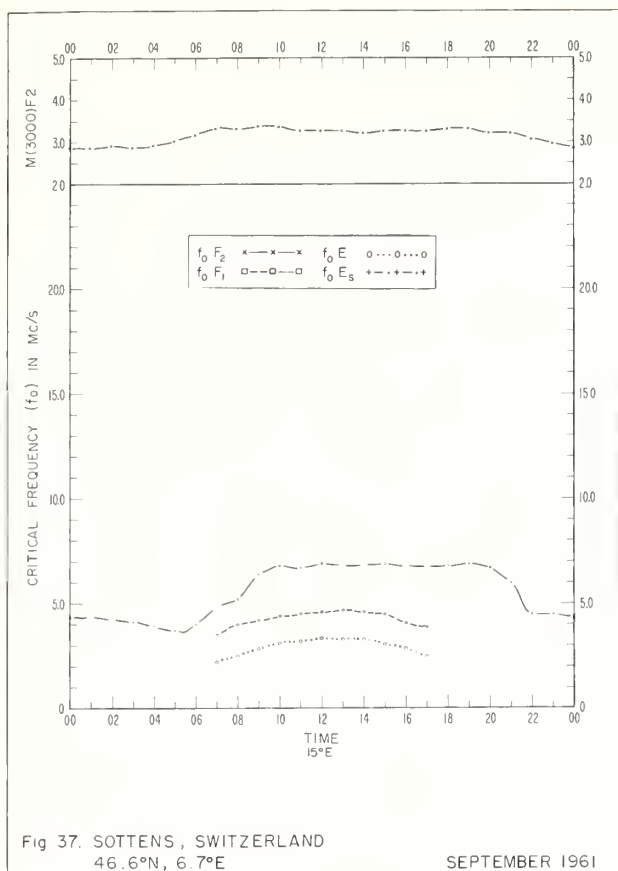
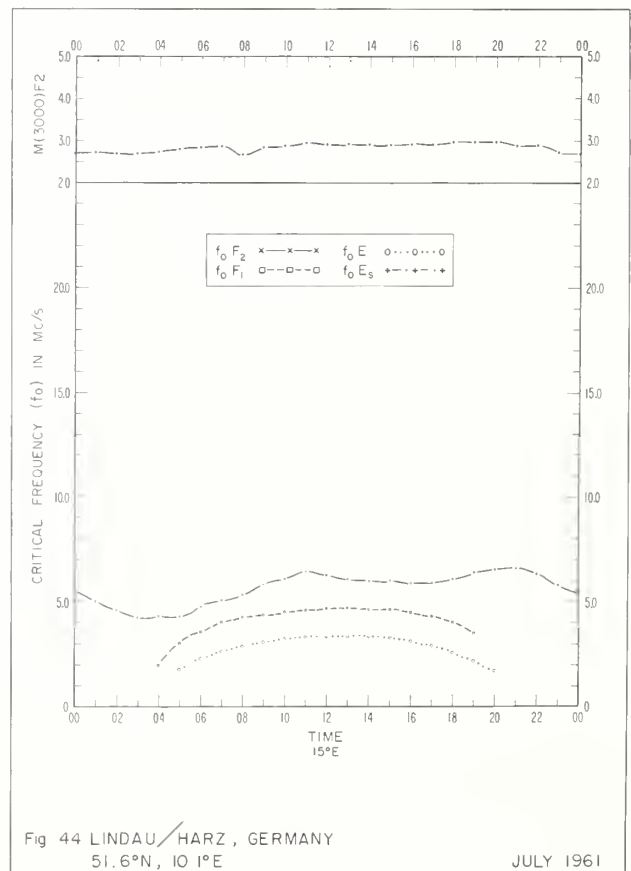
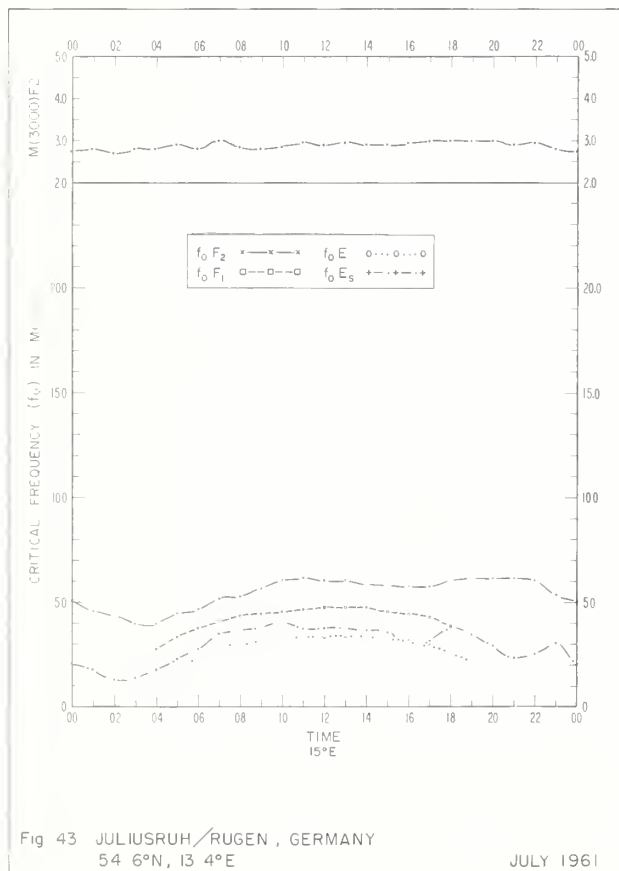
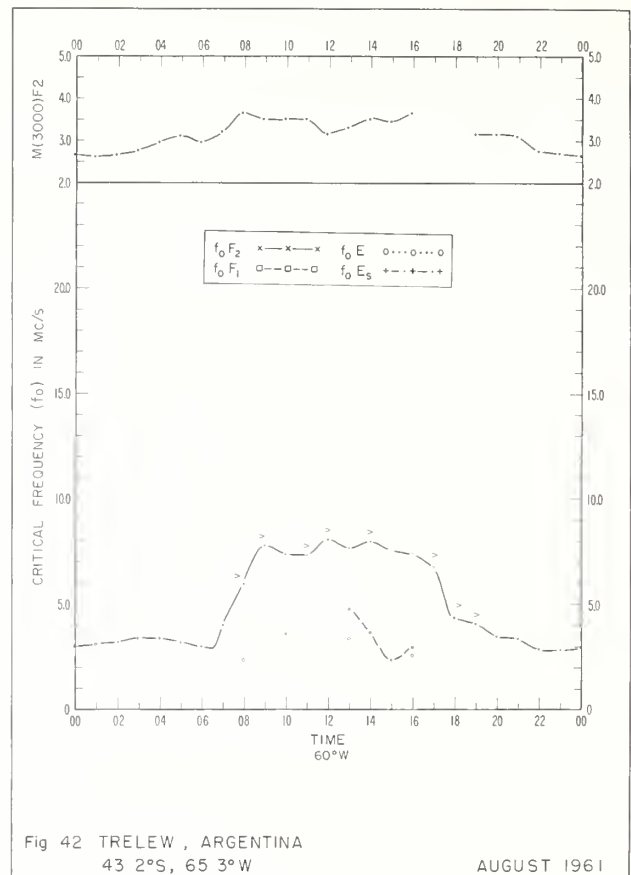
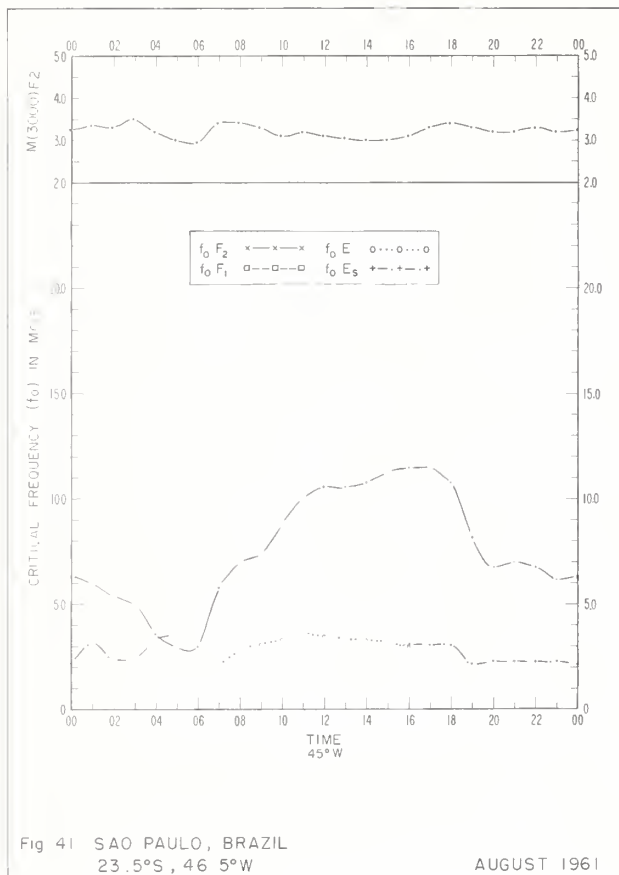


Fig. 32. SODANKYLA, FINLAND
67.4°N, 26.6°E

SEPTEMBER 1961







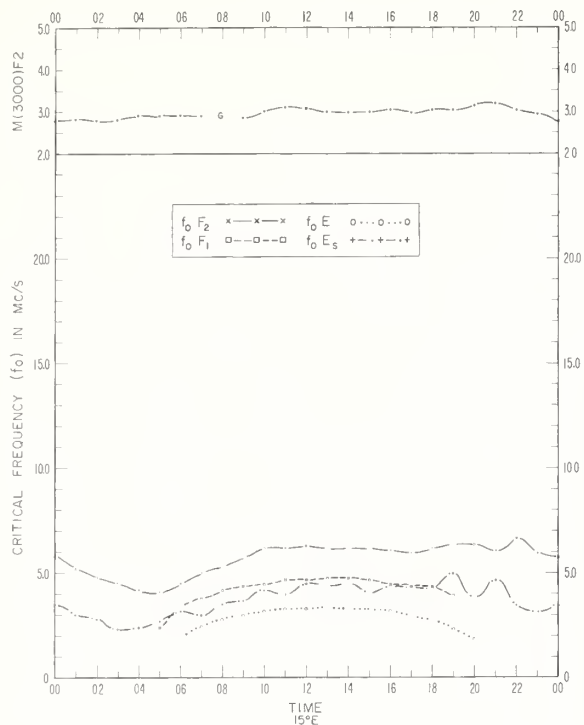


Fig. 45 PARIS, FRANCE
48 1°N, 2.3°E

JULY 1961

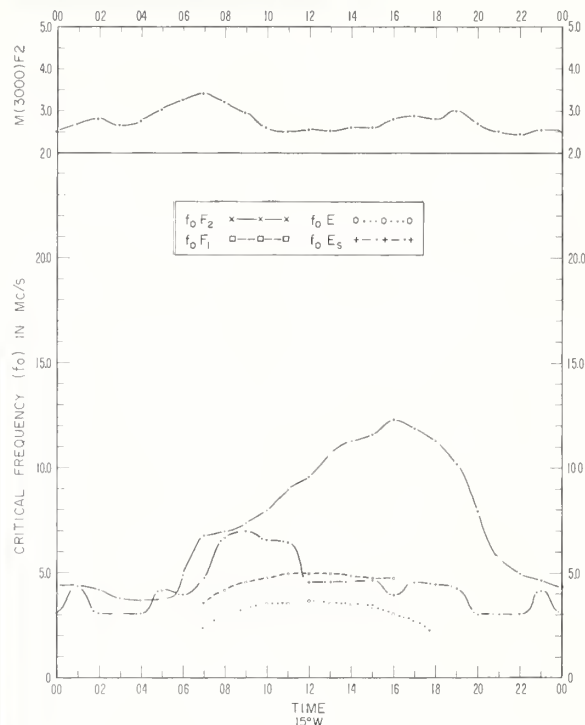


Fig. 46 DAKAR, SENEGAL
14.8°N, 17.4°W

JULY 1961

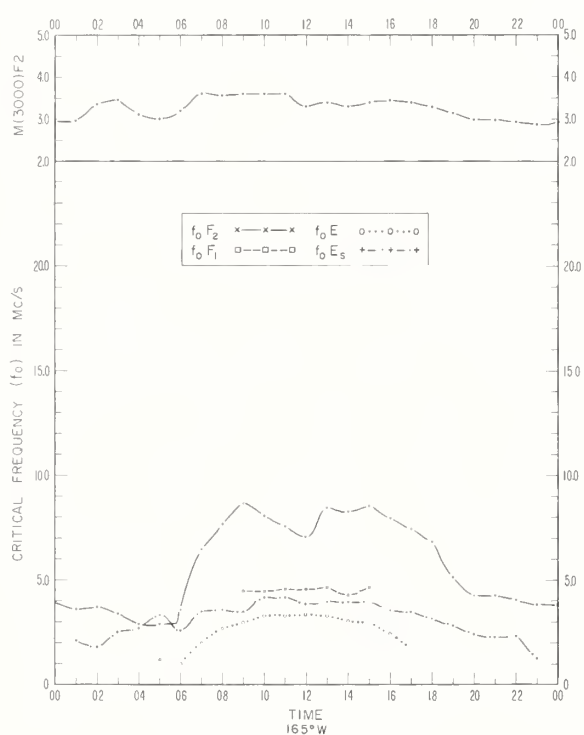


Fig. 47. RAROTONGA, COOK IS.
21.2°S, 159.8°W

JULY 1961

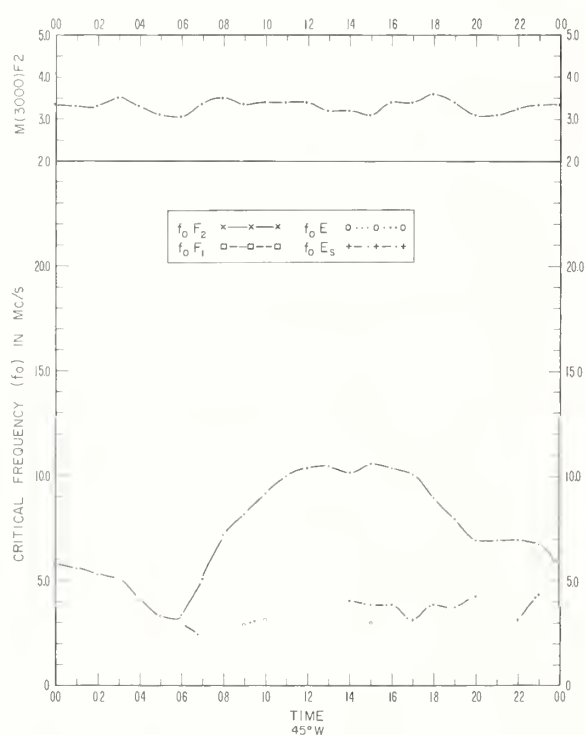
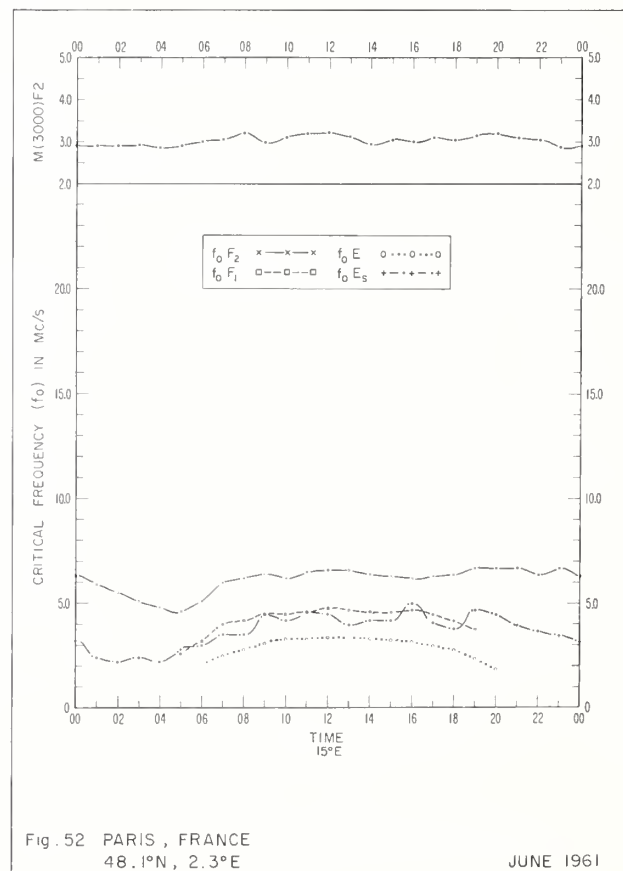
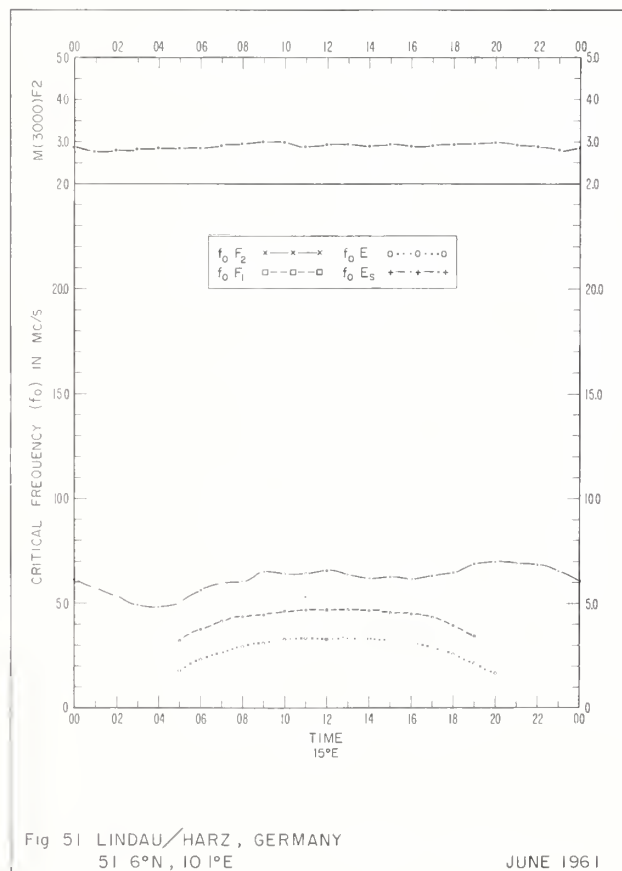
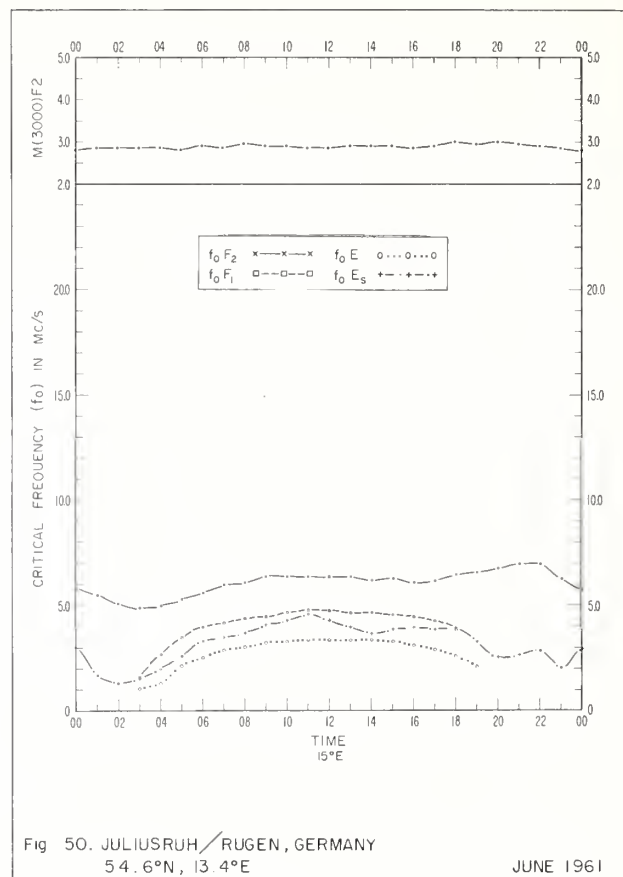
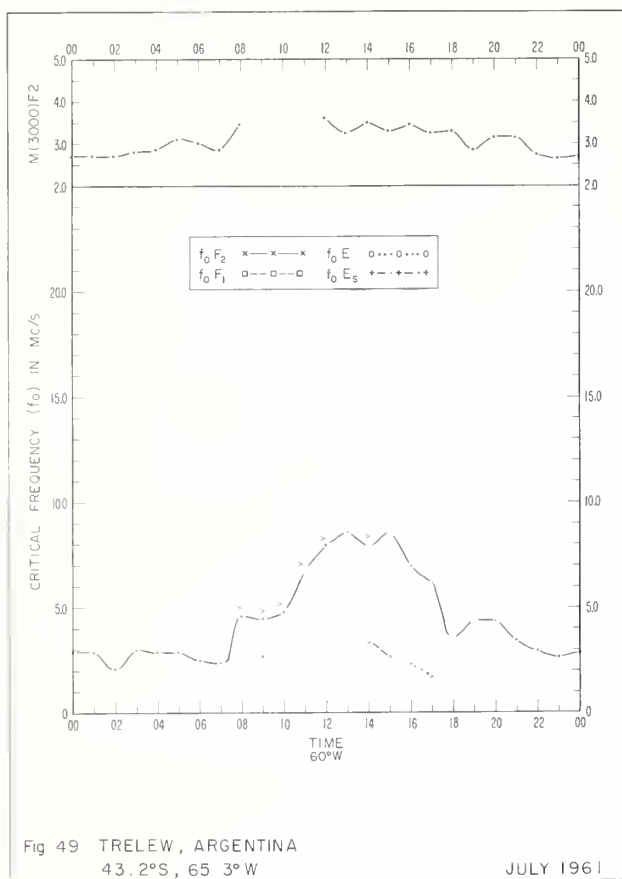


Fig. 48 SAO PAULO, BRAZIL
23.5°S, 46.5°W

JULY 1961



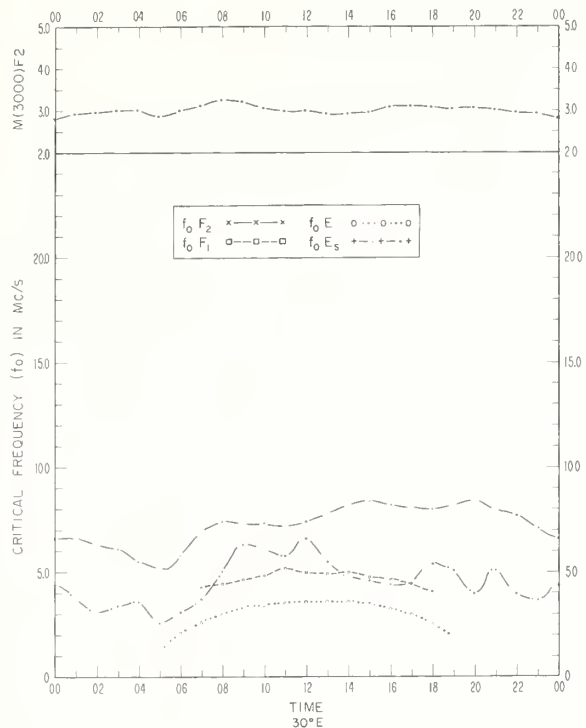


Fig. 53 ATHENS, GREECE
38.0°N, 23.6°E

JUNE 1961

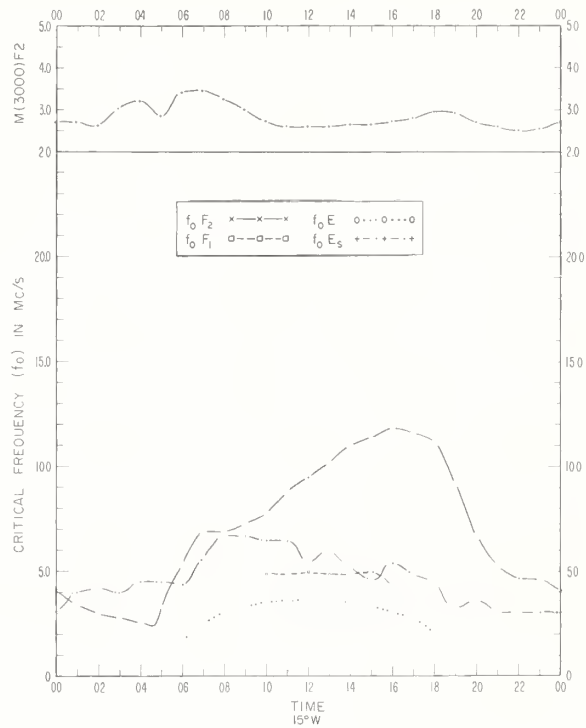


Fig. 54 DAKAR, SENEGAL
14.8°N, 17.4°W

JUNE 1961

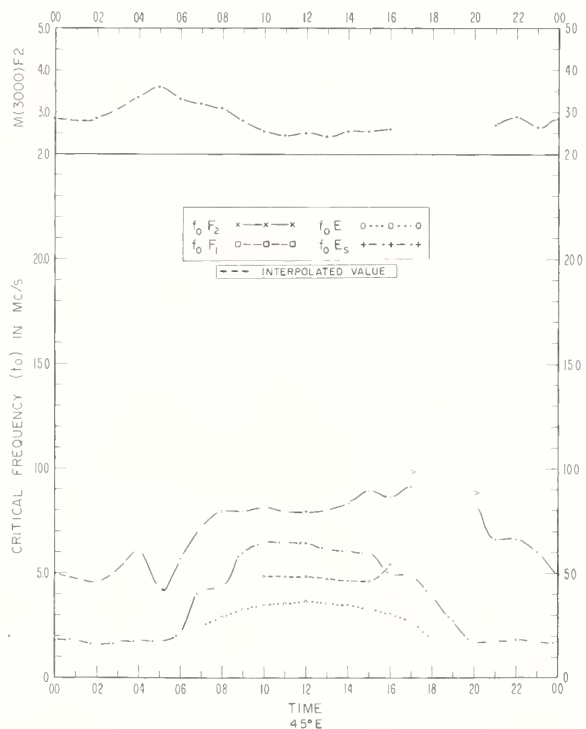


Fig. 55 DJIBOUTI, FRENCH SOMALILAND
11.6°N, 43.2°E

JUNE 1961

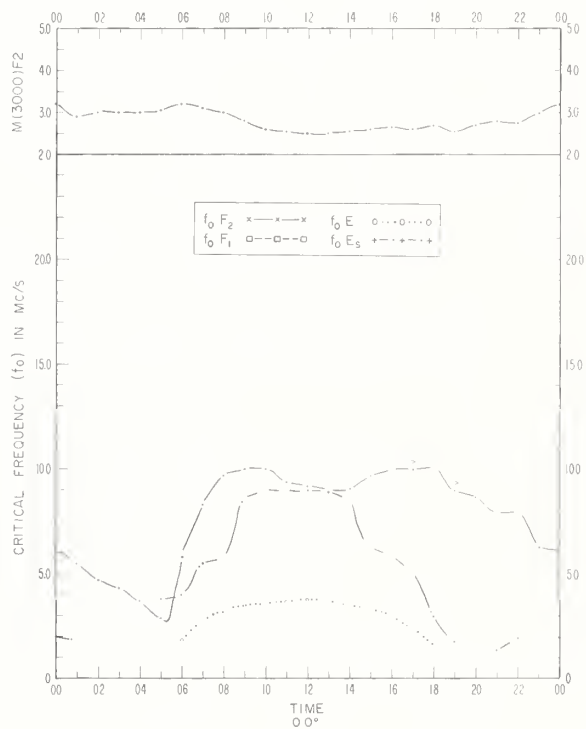
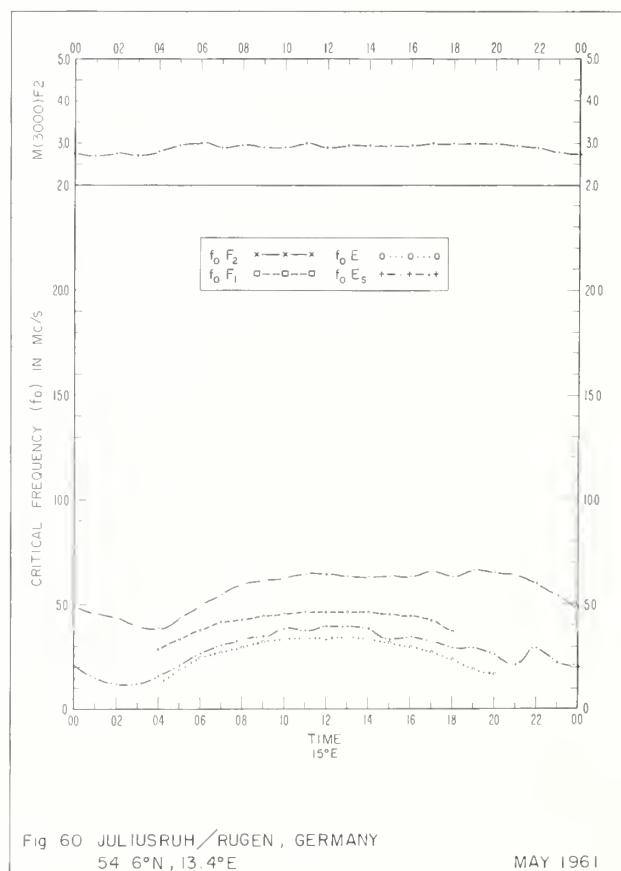
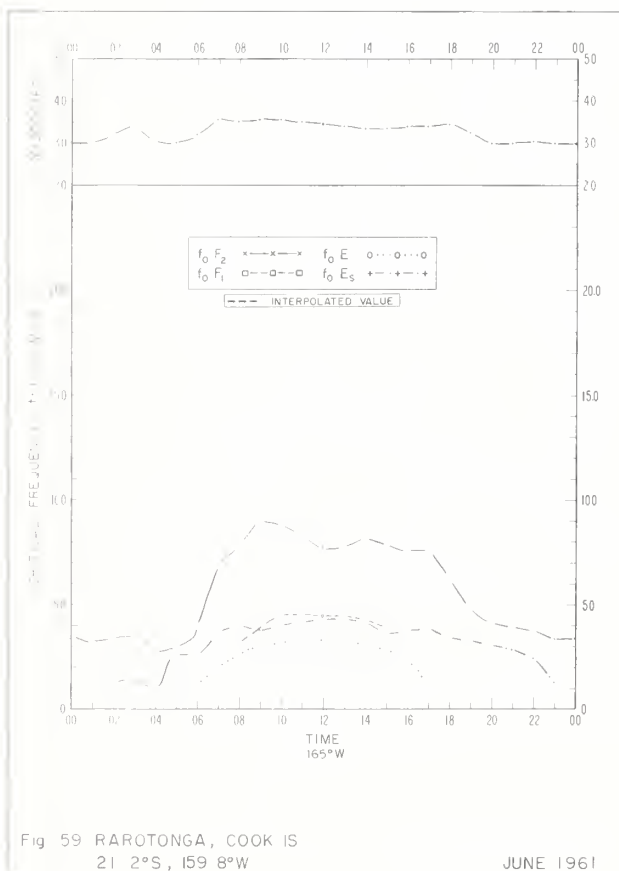
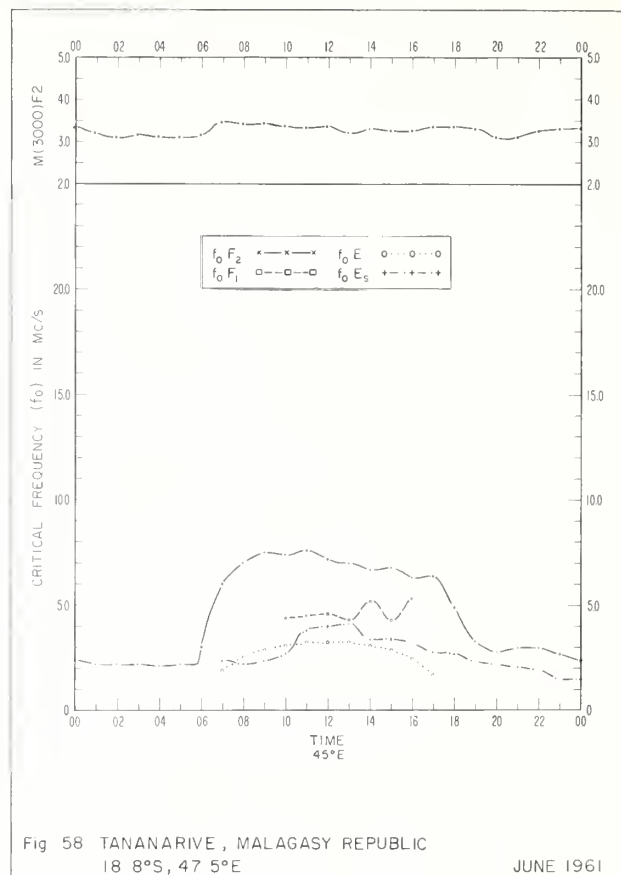
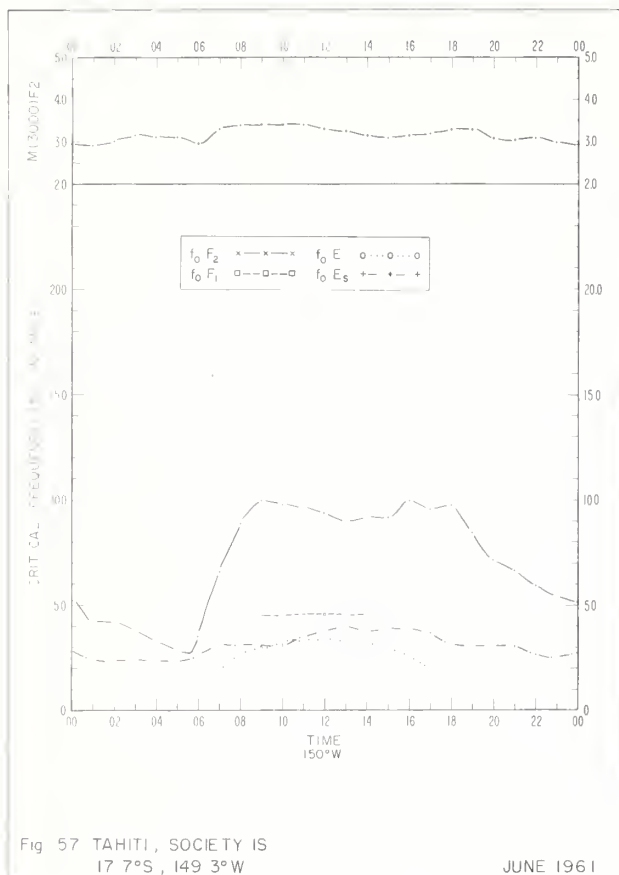


Fig. 56 IBADAN, NIGERIA
7.4°N, 3.9°E

JUNE 1961



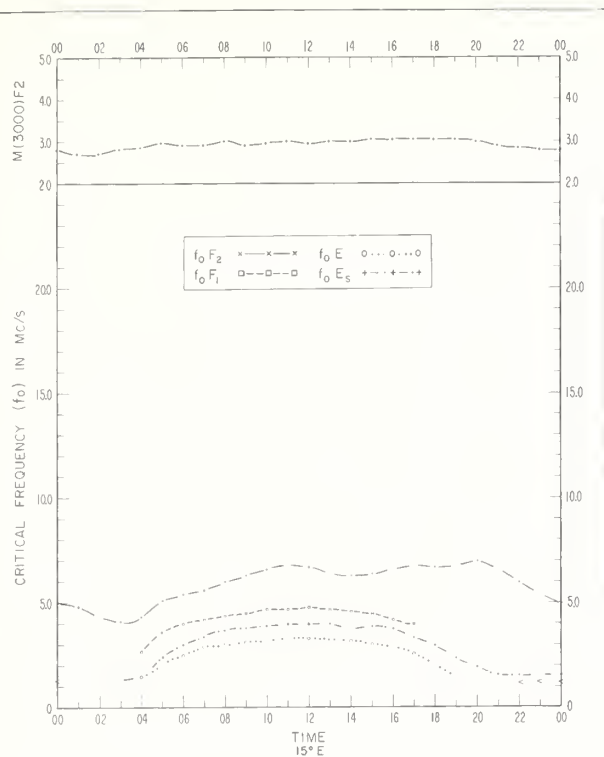


Fig 61 WARSAW, POLAND
52 2°N, 21 2°E

MAY 1961

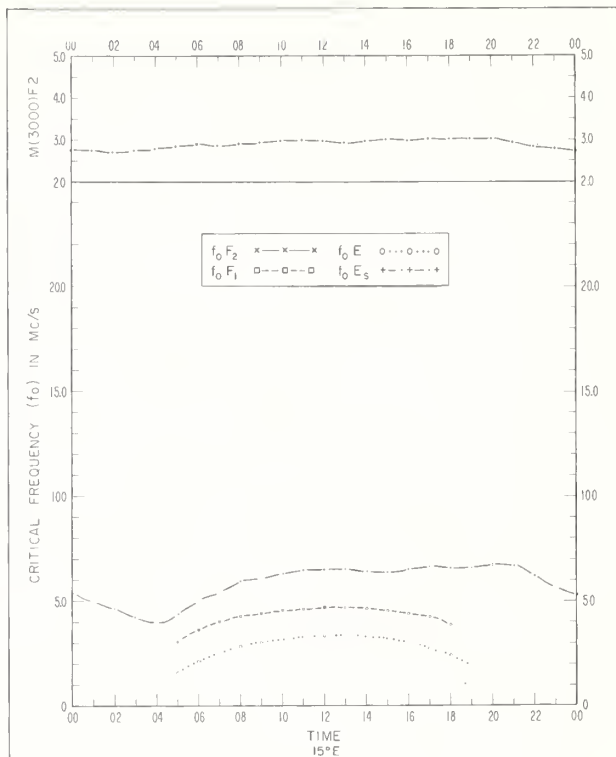


Fig 62 LINDAU/HARZ, GERMANY
51 6°N, 10 1°E

MAY 1961

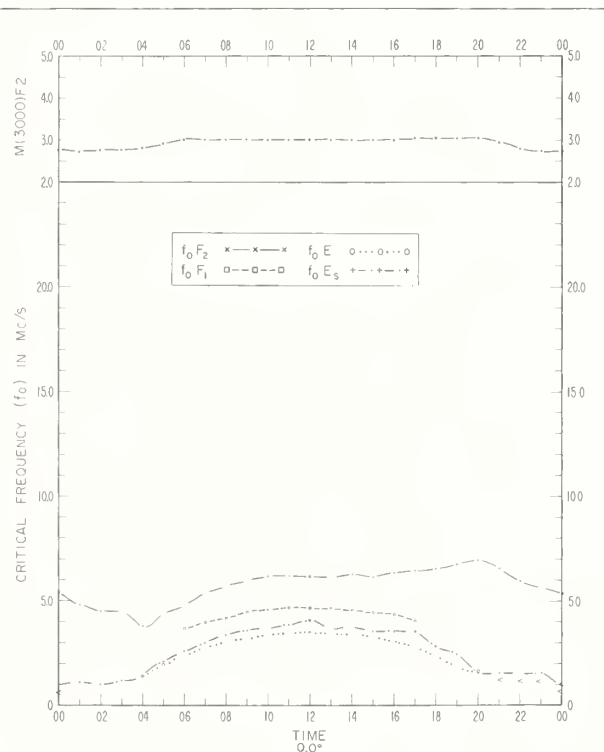


Fig 63. SLOUGH, ENGLAND
51.5°N, 0.6°W

MAY 1961

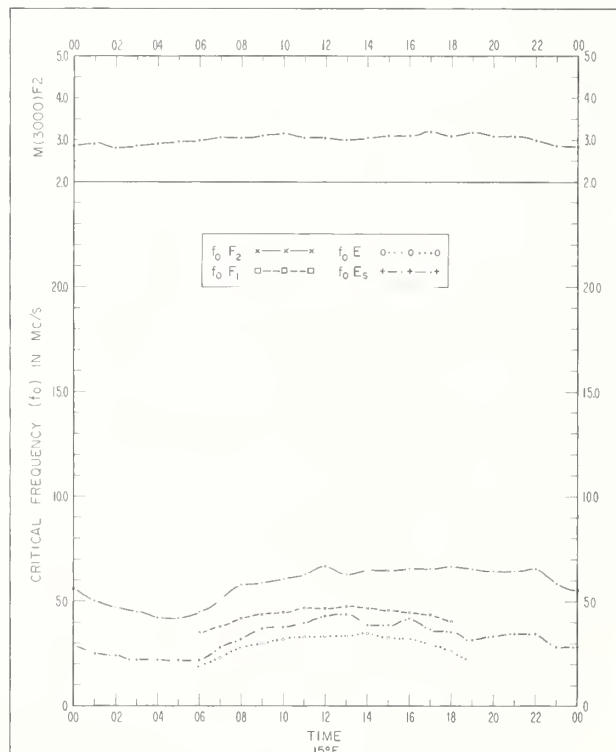
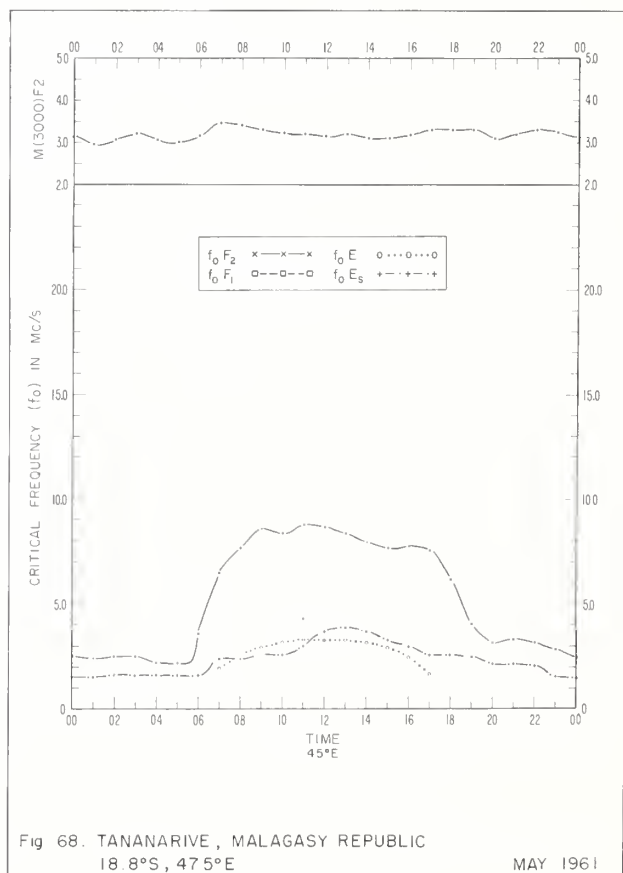
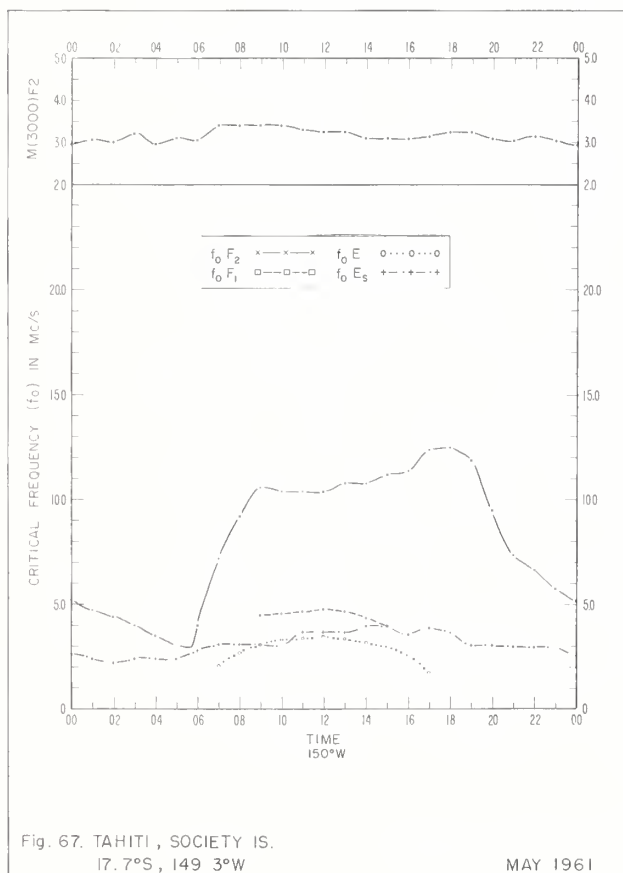
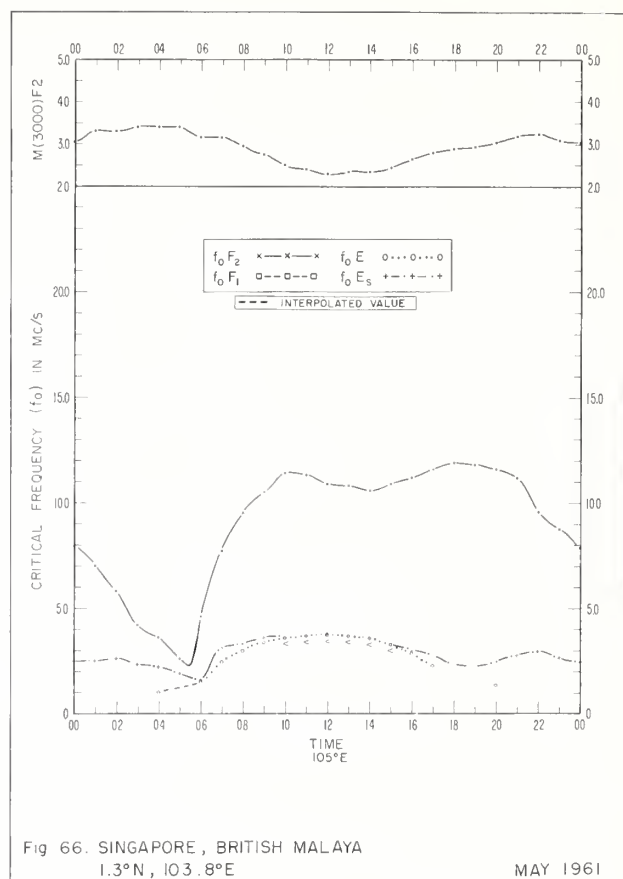
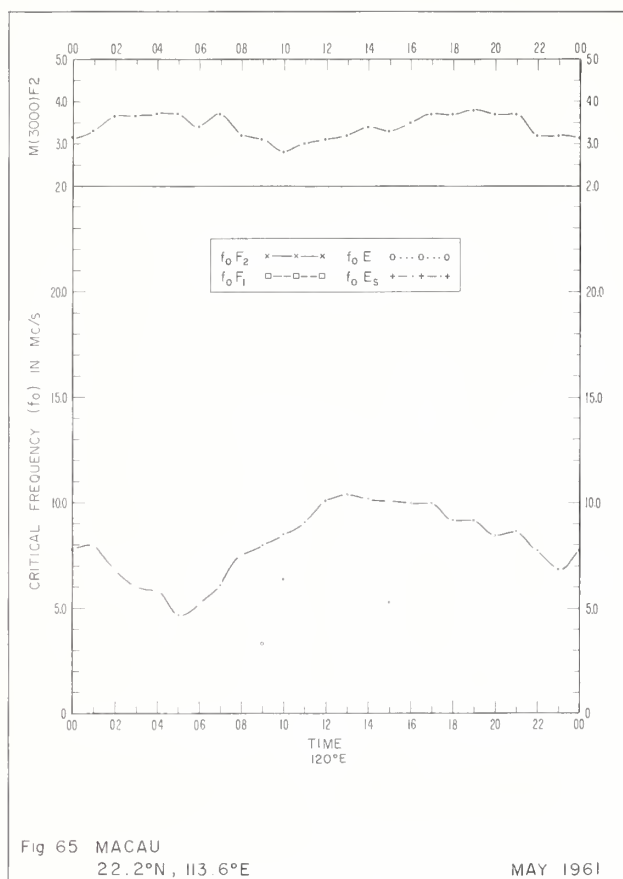


Fig 64 PARIS, FRANCE
48.1°N, 2.3°E

MAY 1961



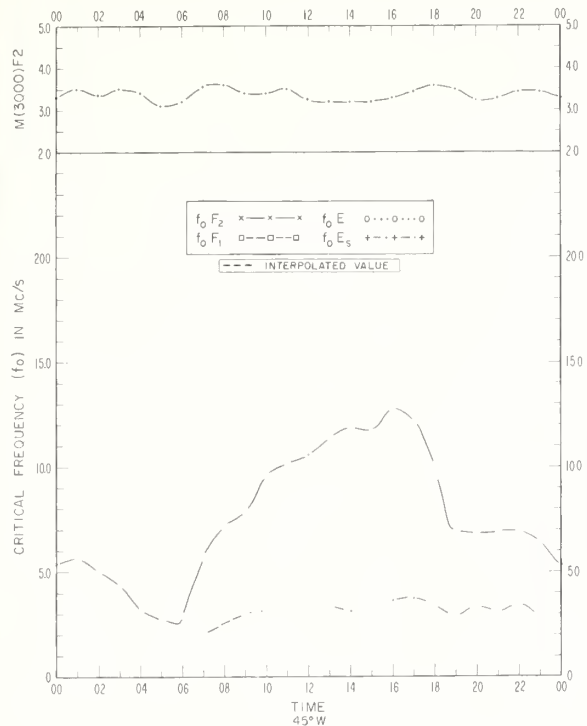


Fig 69 SAO PAULO, BRAZIL
23°S, 46.5°W

MAY 1961

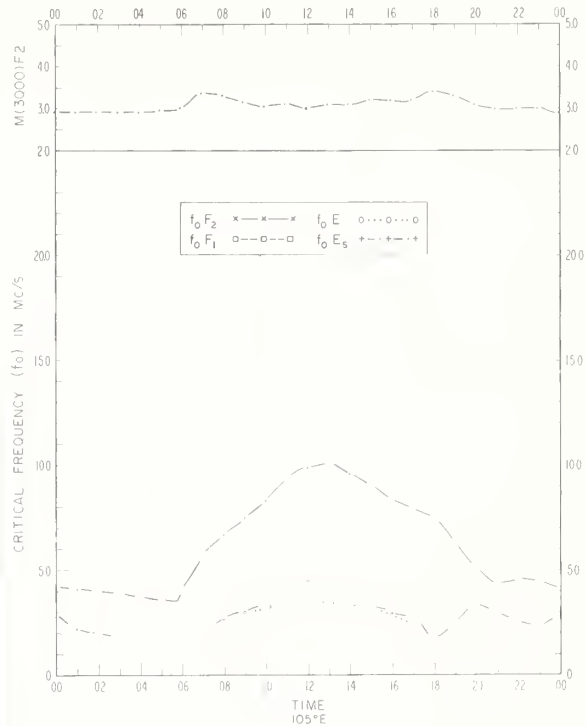


Fig 70 WHITE SANDS, NEW MEXICO
32.3°N, 106°5'W

MARCH 1961

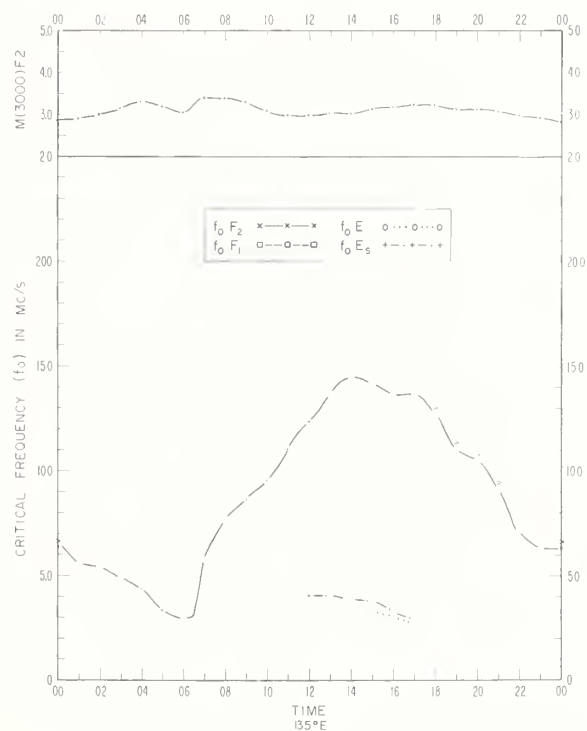


Fig. 71. OKINAWA I.
26.3°N, 127.8°E

MARCH 1961

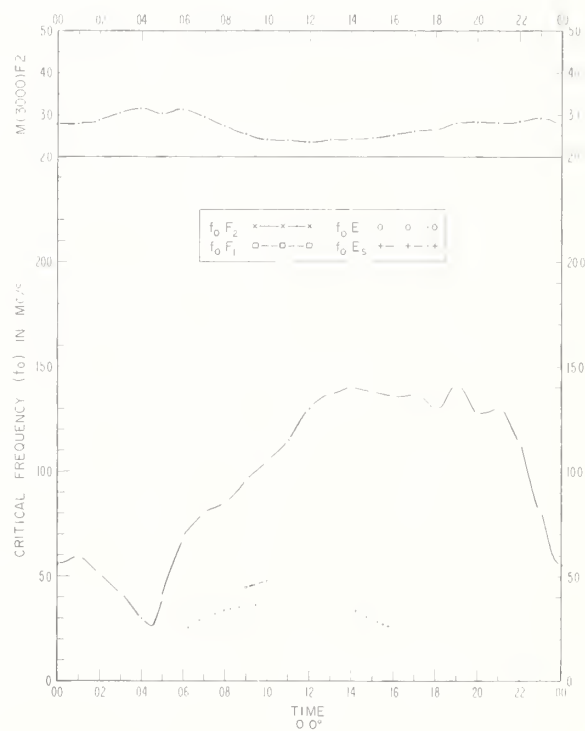
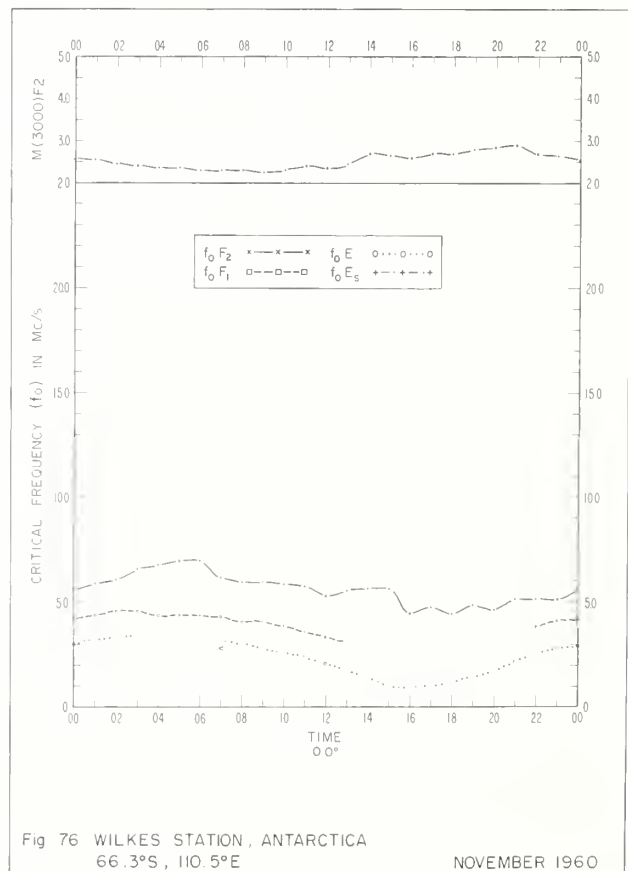
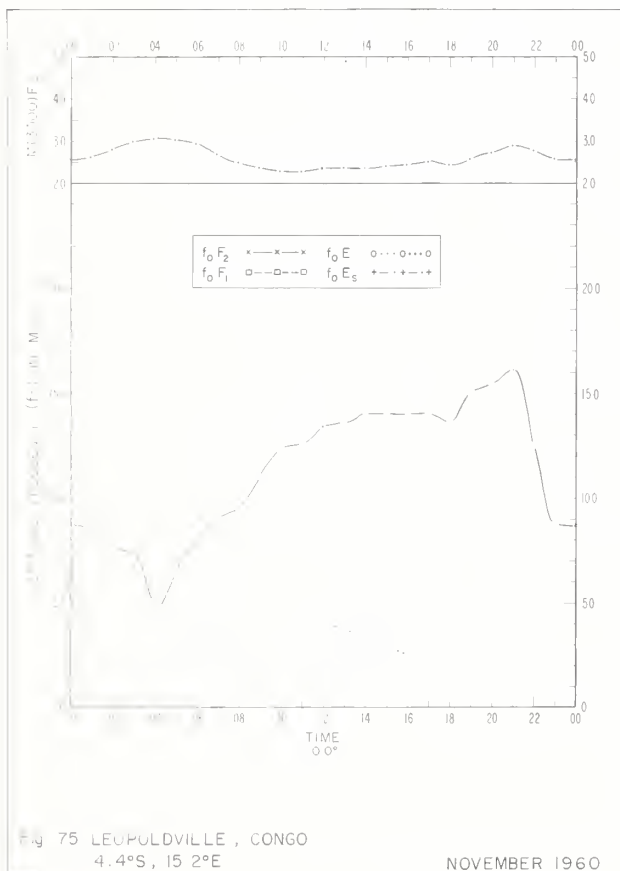
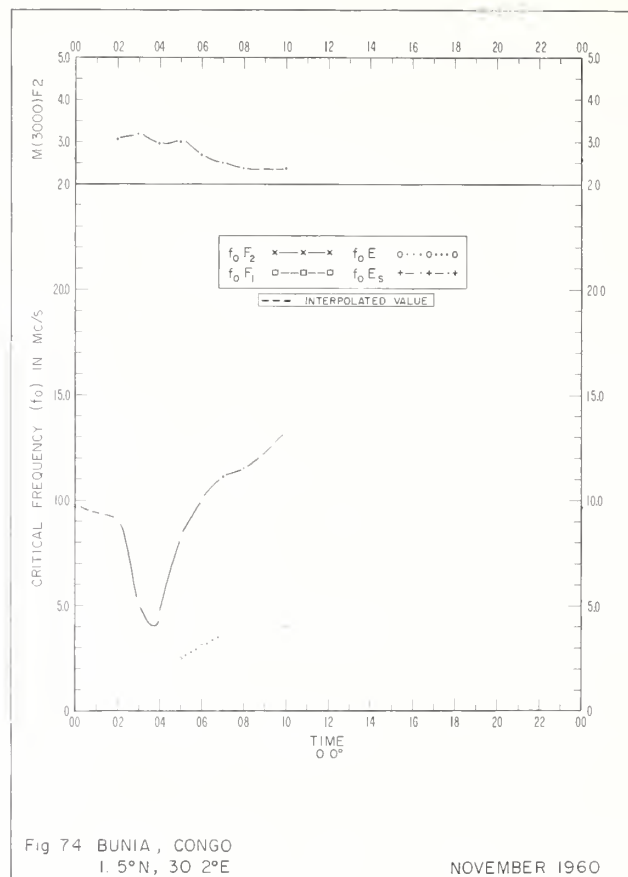
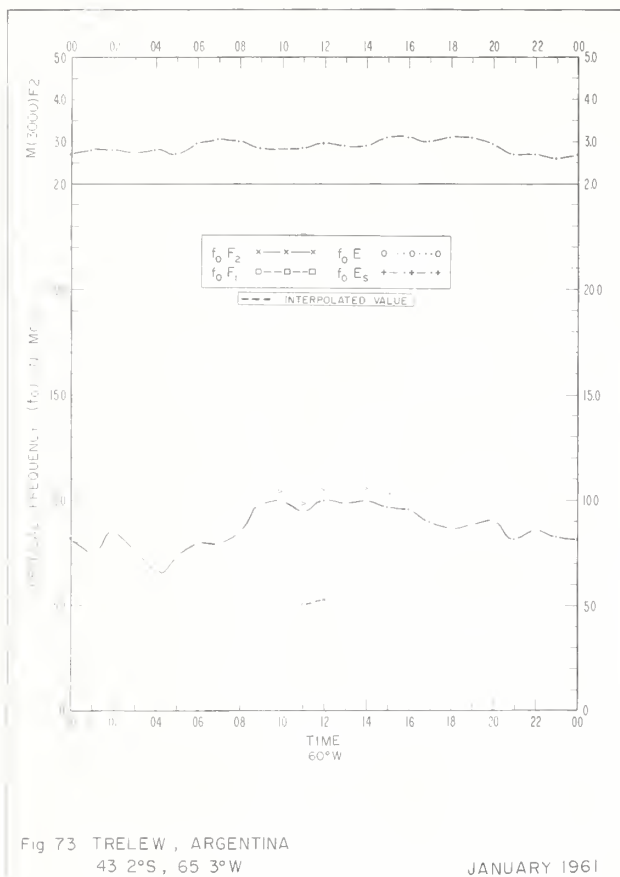


Fig 72. LEOPOLDVILLE, CONGO
4°S, 15.2°E

MARCH 1961



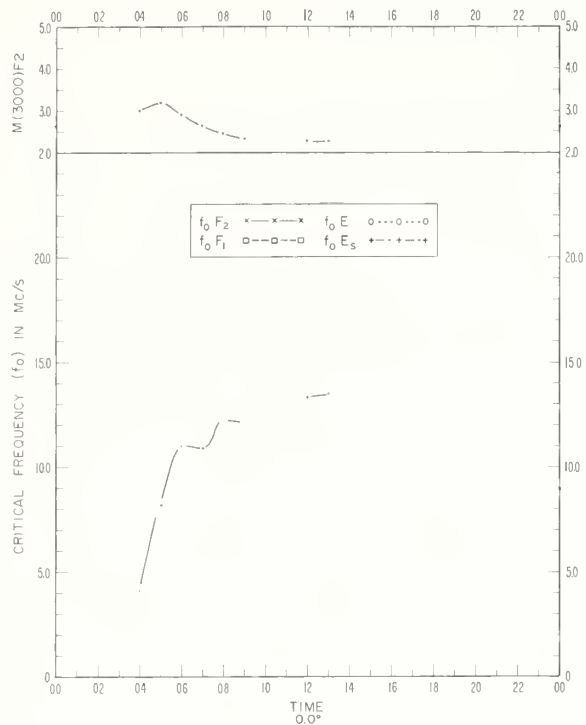


Fig 77 BUNIA, CONGO
1 5°N, 30 2°E

OCTOBER 1960

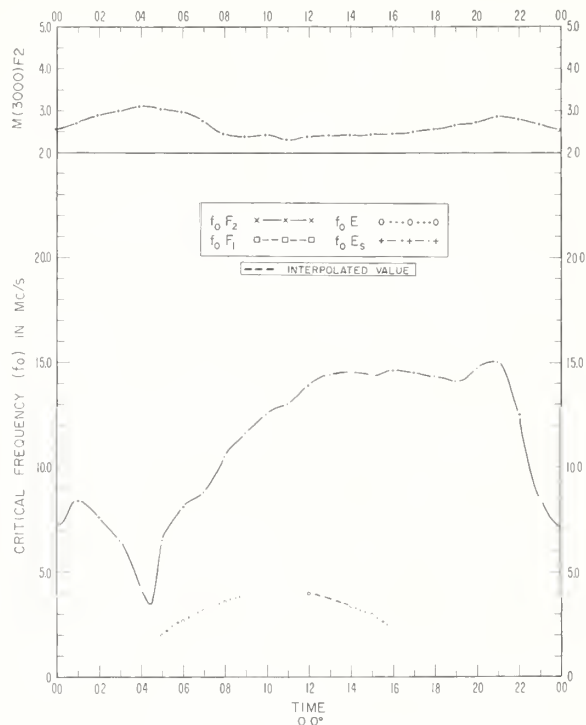


Fig 78. LEOPOLDVILLE, CONGO
4 4°S, 15 2°E

OCTOBER 1960

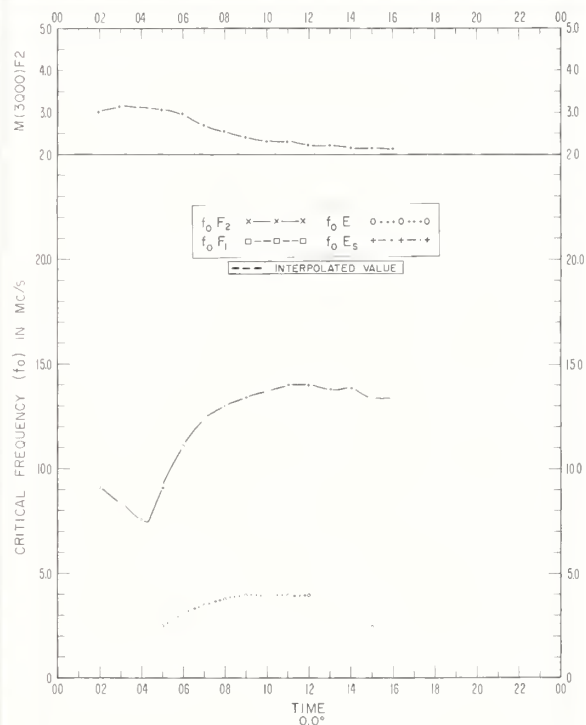


Fig. 79. BUNIA, CONGO
1.5°N, 30 2°E

SEPTEMBER 1960

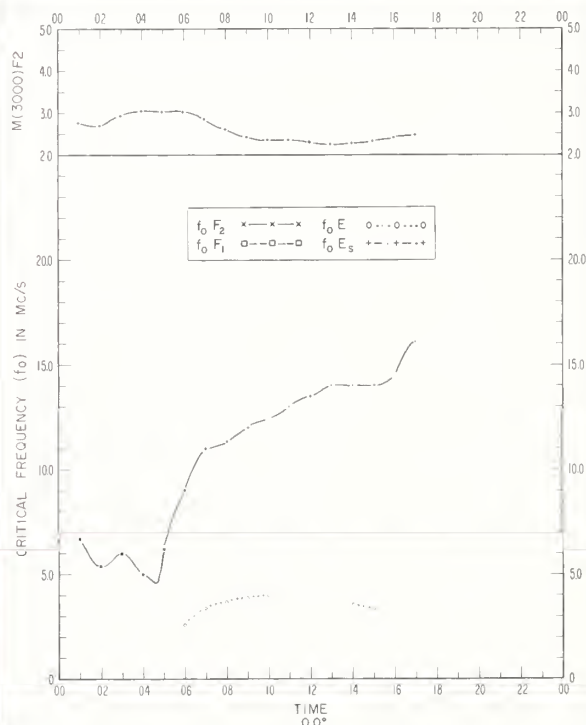
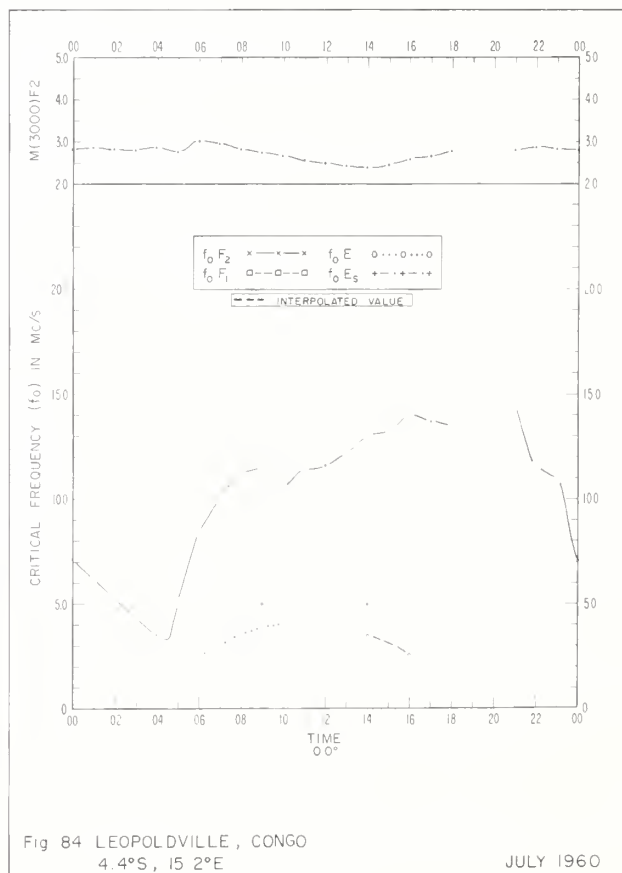
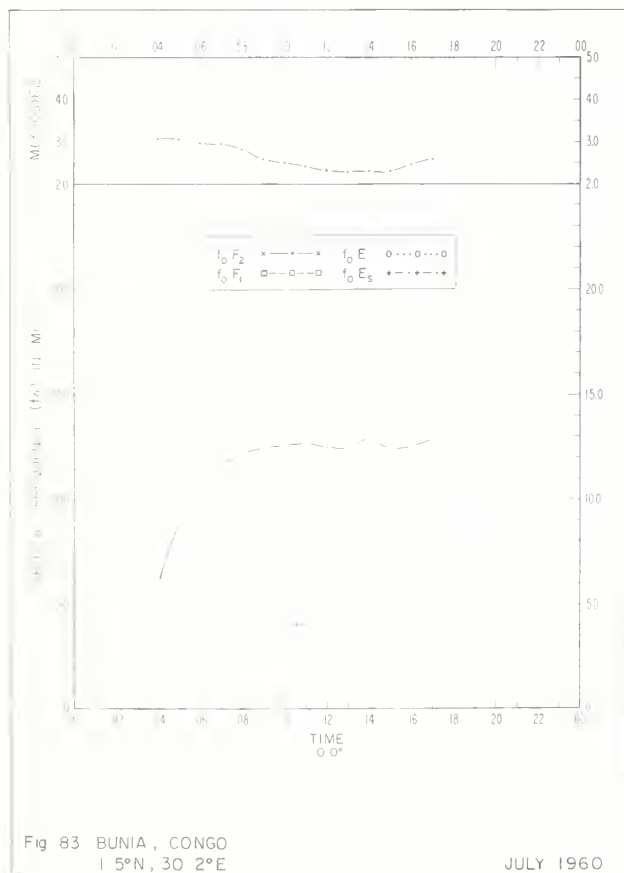
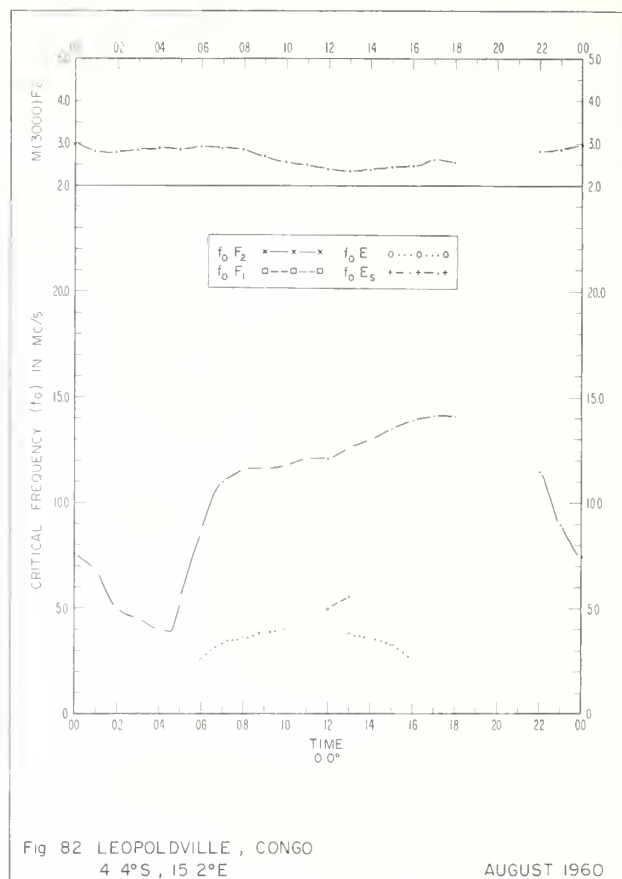
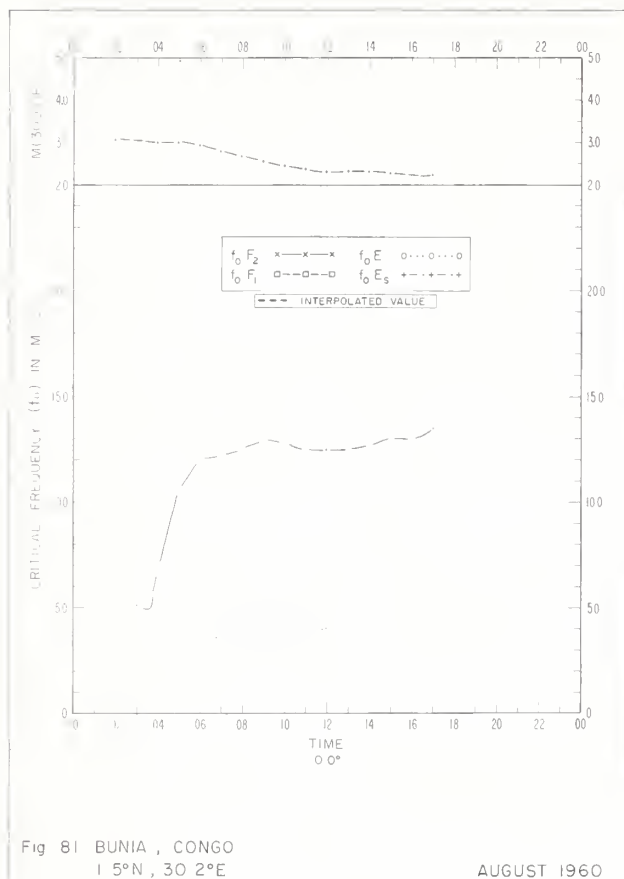


Fig 80 LEOPOLDVILLE, CONGO
4.4°S, 15 2°E

SEPTEMBER 1960



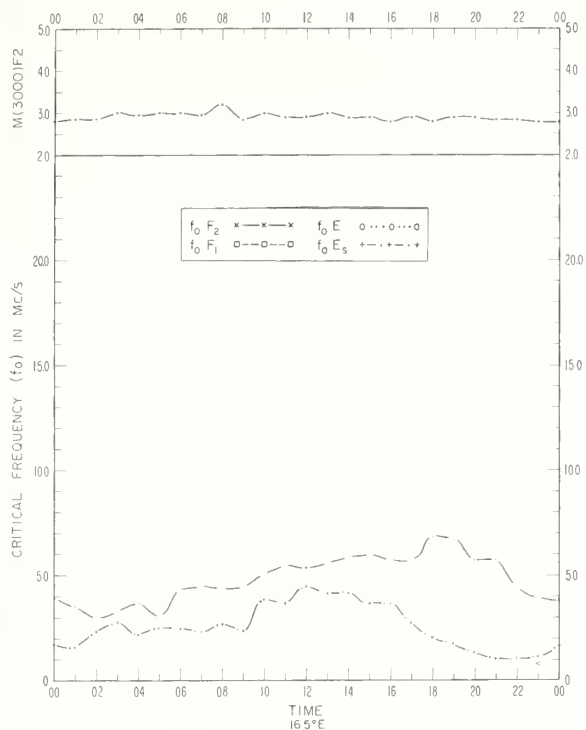


Fig 85. CAPE HALLETT, ANTARCTICA
72.3°S, 170.2°E

JUNE 1960

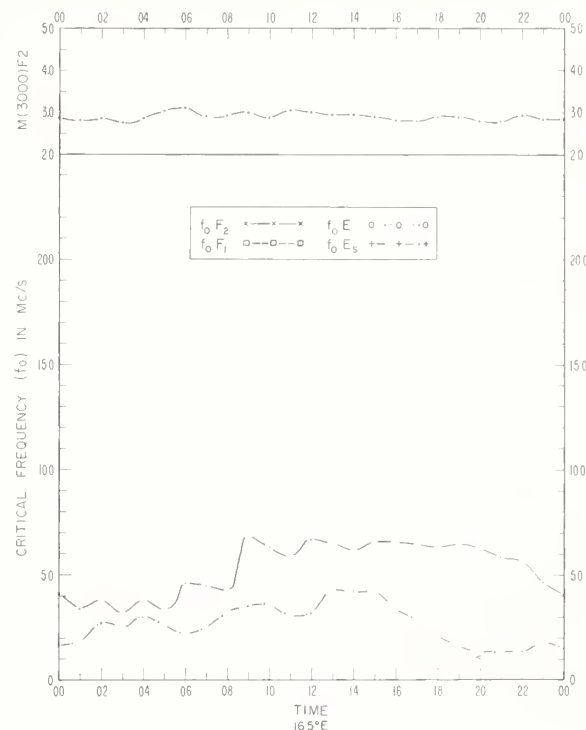


Fig 86 CAPE HALLETT, ANTARCTICA
72.3°S, 170.2°E

MAY 1960

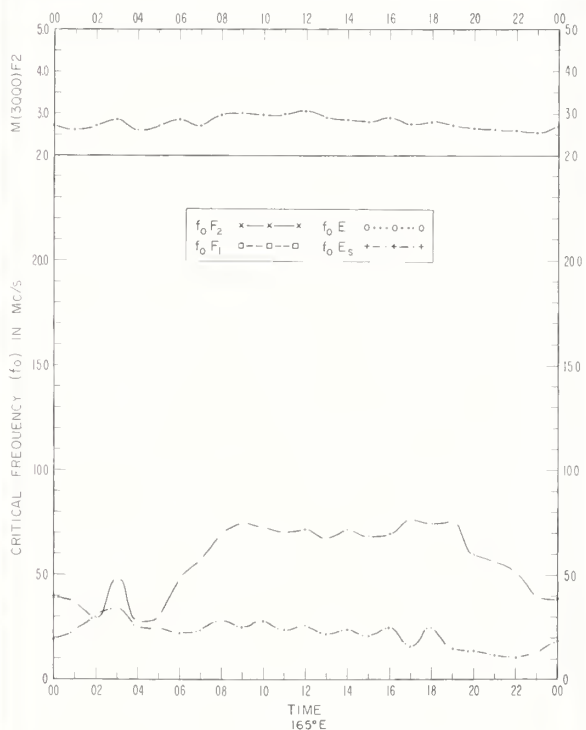


Fig 87. CAPE HALLETT, ANTARCTICA
72.3°S, 170.2°E

APRIL 1960

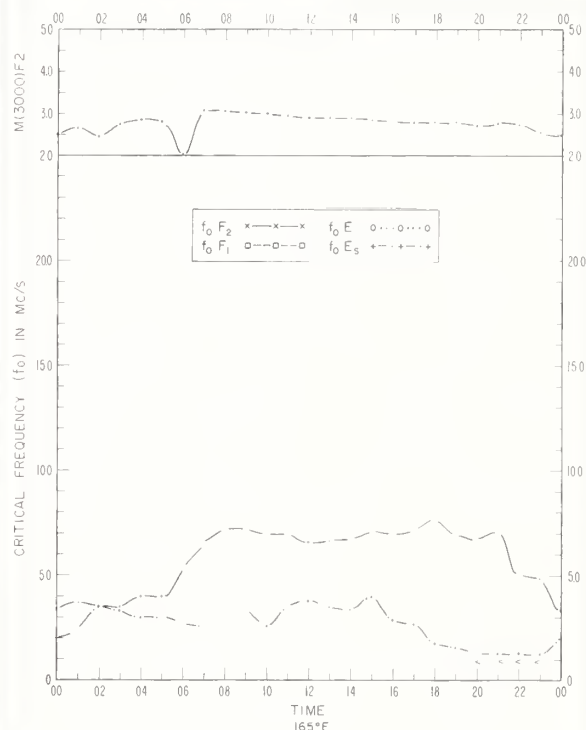


Fig 88. CAPE HALLETT, ANTARCTICA
72.3°S, 170.2°E

MARCH 1960

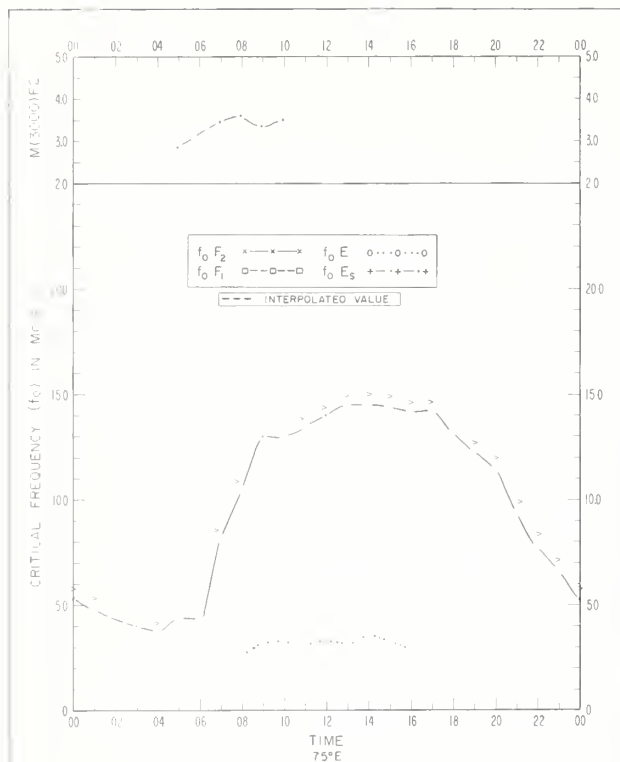


Fig 89 DELHI, INDIA
28 6°N, 77 2°E

FEBRUARY 1960

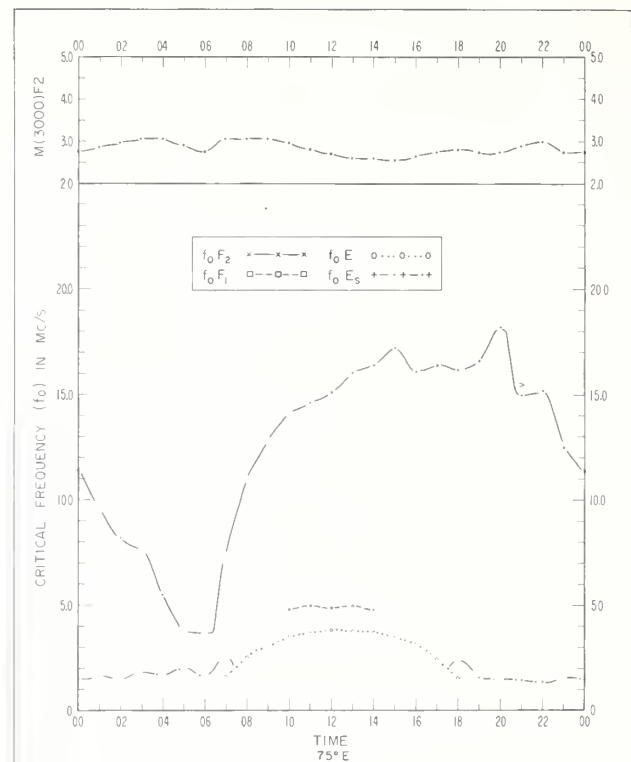


Fig 90 AHMEDABAD, INDIA
23 0°N, 72 6°E

FEBRUARY 1960

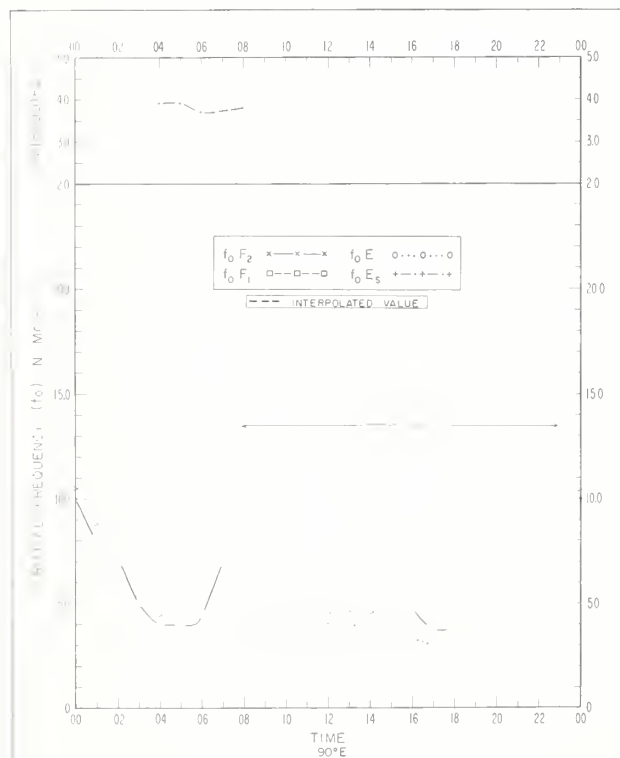


Fig 91 CALCUTTA, INDIA
23 0°N, 88 6°E

FEBRUARY 1960

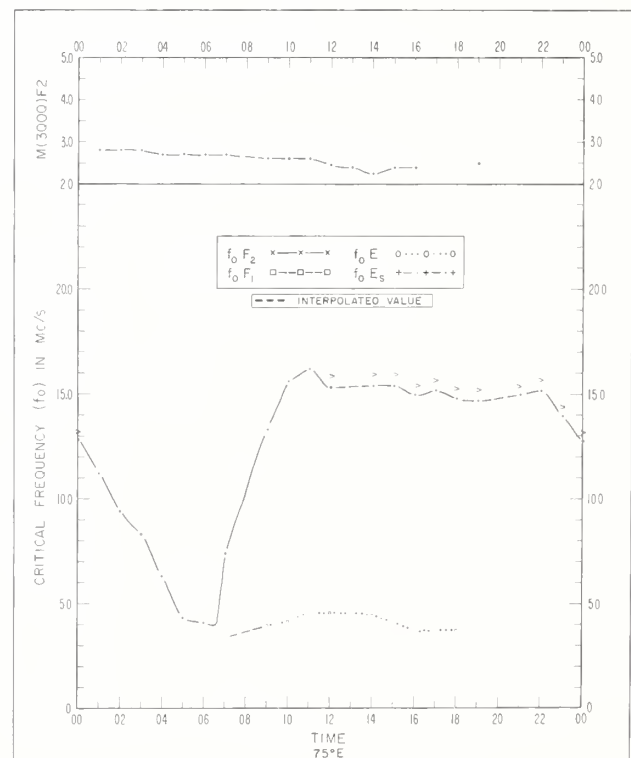


Fig 92 BOMBAY, INDIA
19 0°N, 72 8°E

FEBRUARY 1960

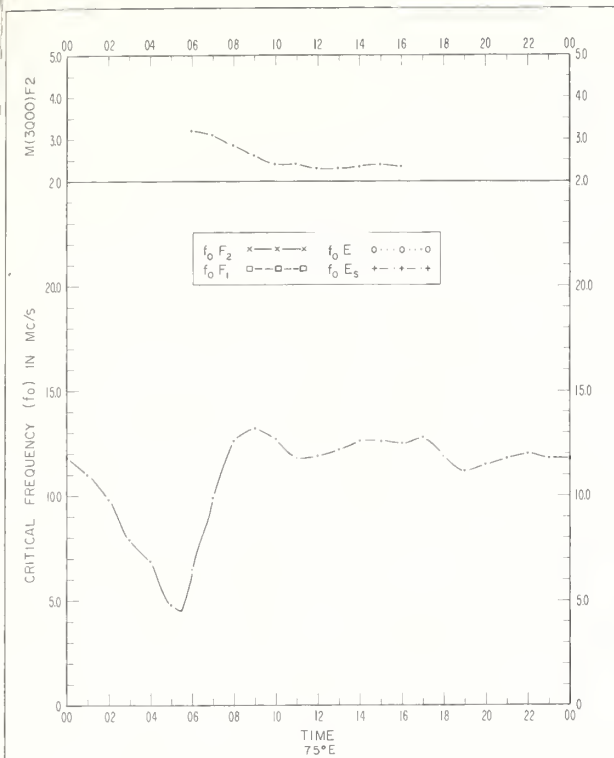


Fig. 93 MADRAS, INDIA
13 1°N, 80 3°E

FEBRUARY 1960

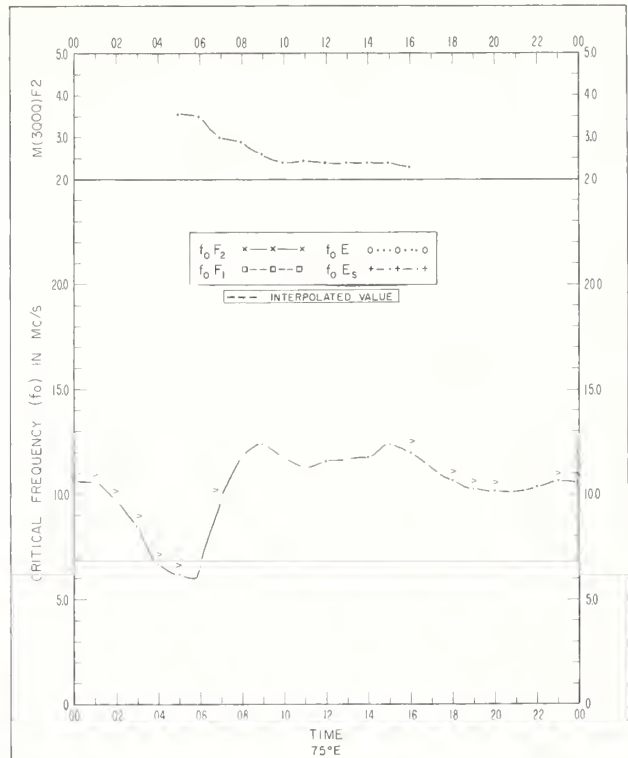


Fig. 94 TIRUCHY, INDIA
10.8°N, 78 7°E

FEBRUARY 1960

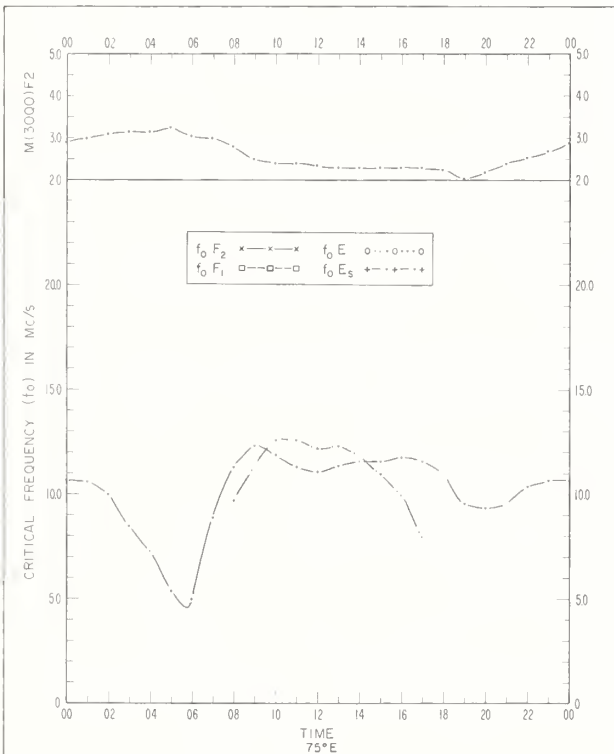


Fig. 95 KODAIKANAL, INDIA
10 2°N, 77 5°E

FEBRUARY 1960

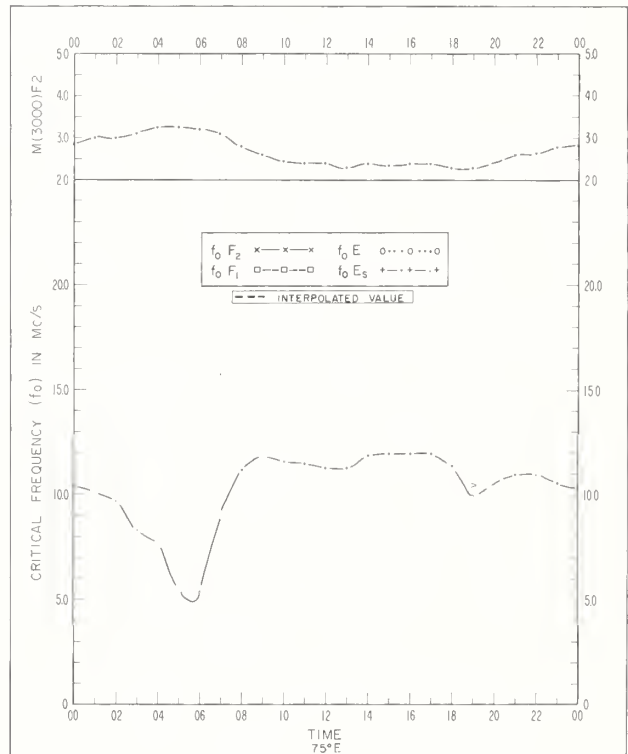
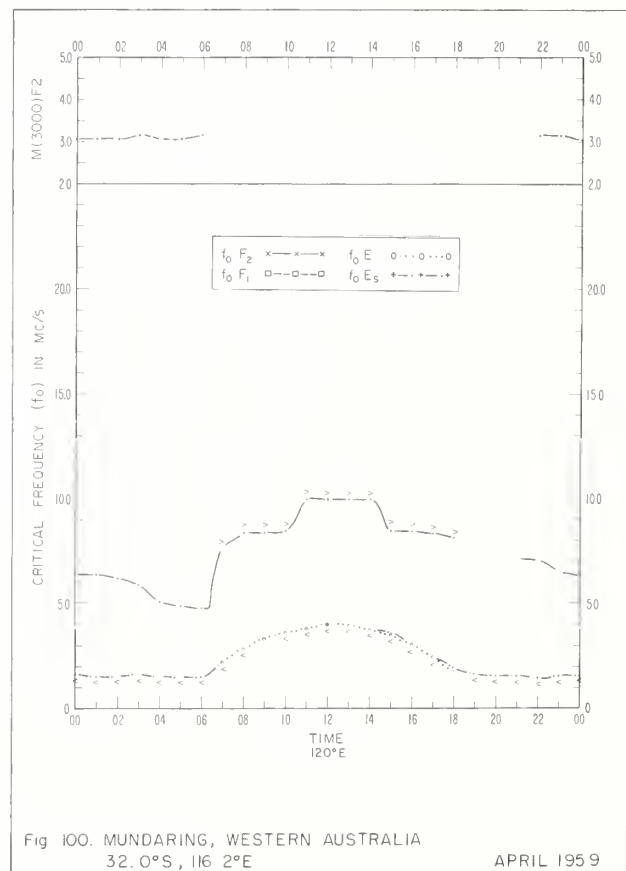
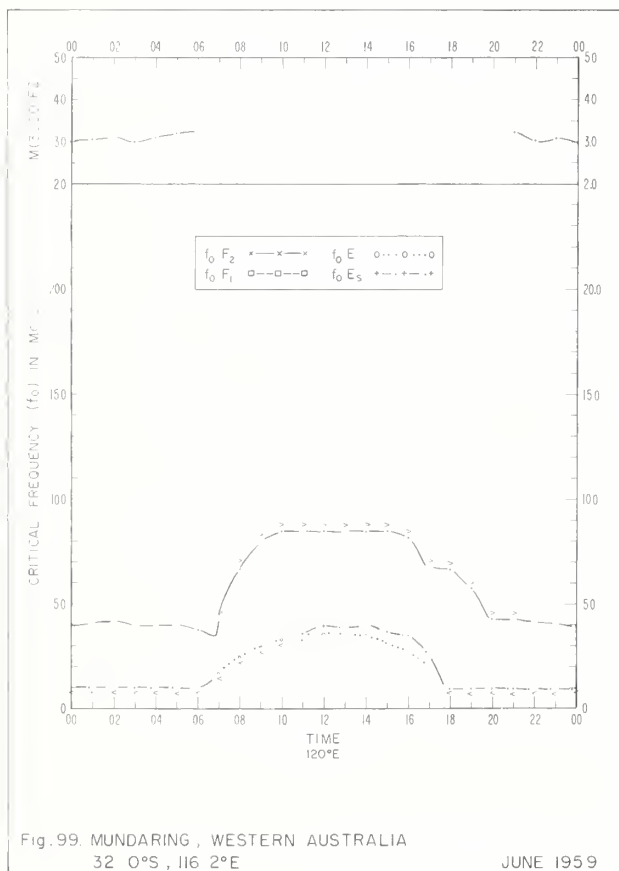
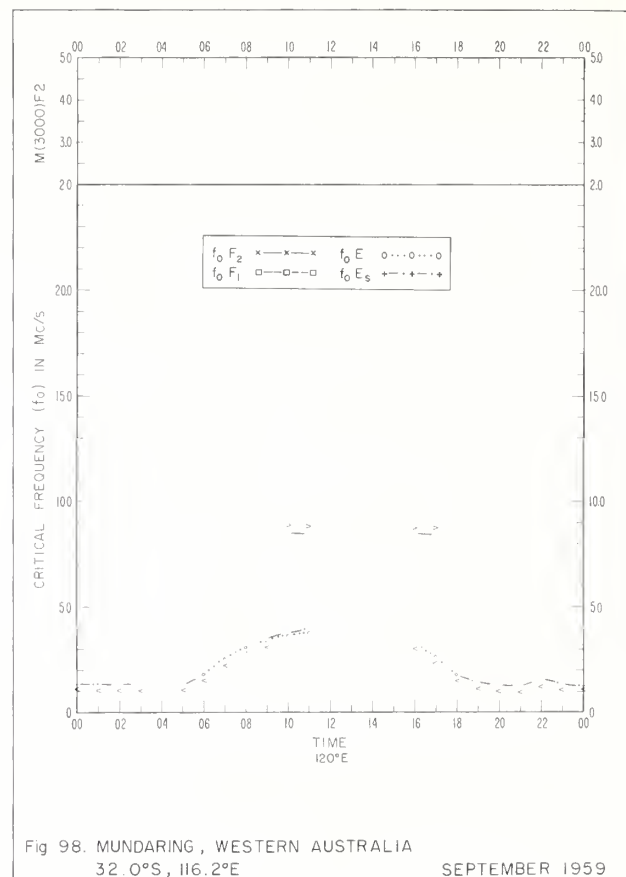
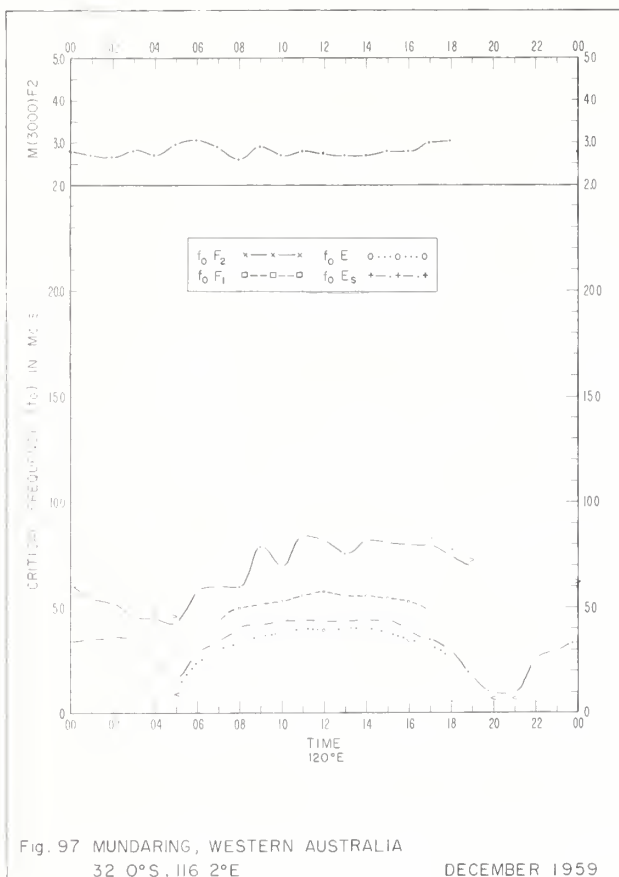


Fig. 96 TRIVANDRUM, INDIA
8.5°N, 77.0°E

FEBRUARY 1960



INDEX OF IONOSPHERIC DATA IN CRPL F227

			PAGE	
			TABLE	FIGURE
AHMEDABAD, INDIA	1960	FEB.	23	48
AKITA, JAPAN	1961	NOV.	4	29
ATHENS, GREECE	1961	JUNE	14	39
BAGUIO, LUZON	1961	SEPT.	10	35
	1961	NOV.	5	30
	1962	OCT.	1	26
	1962	NOV.	1	26
BOMBAY, INDIA	1960	FEB.	23	48
BRISBANE, AUSTRALIA	1961	NOV.	6	31
BUNIA, CONGO	1960	JULY	21	46
	1960	AUG.	21	46
	1960	SEPT.	20	45
	1960	OCT.	20	45
	1960	NOV.	19	44
CALCUTTA, INDIA	1960	FEB.	23	48
CANBERRA, AUSTRALIA	1961	NOV.	6	31
CAPE HALLETT, ANTARCTICA	1960	MAR.	22	47
	1960	APR.	22	47
	1960	MAY	22	47
	1960	JUNE	22	47
CAPETOWN, UNION OF S. AFRICA	1961	NOV.	6	31
CHRISTCHURCH, NEW ZEALAND	1961	NOV.	7	32
DAKAR, SENEGAL	1961	JUNE	14	39
	1961	JULY	12	37

INDEX OF IONOSPHERIC DATA IN CRPL F227			PAGE	
			TABLE	FIGURE
DELHI, INDIA	1960	FEB.	23	48
DJIBOUTI, FRENCH SOMALILAND	1961	JUNE	14	39
FT. MONMOUTH, NEW JERSEY	1962	APR.	2	27
IBADAN, NIGERIA	1961	JUNE	14	39
	1961	OCT.	8	33
INVERNESS, SCOTLAND	1961	OCT.	7	32
JOHANNESBURG, UNION OF S. AFRICA	1961	NOV.	6	31
JULIUSRUH/RUGEN, GERMANY	1961	MAY	15	40
	1961	JUNE	13	38
	1961	JULY	11	36
	1961	OCT.	7	32
KIRUNA, SWEDEN	1961	OCT.	7	32
KODAIKANAL, INDIA	1960	FEB.	24	49
LEOPOLDVILLE, CONGO	1960	JULY	21	46
	1960	AUG.	21	46
	1960	SEPT.	20	45
	1960	OCT.	20	45
	1960	NOV.	19	44
	1961	MAR.	18	43
LINDAU/HARZ, GERMANY	1961	MAY	16	41
	1961	JUNE	13	38
	1961	JULY	11	36
MACAU	1961	MAY	17	42
MADRAS, INDIA	1960	FEB.	24	49

INDEX OF IONOSPHERIC DATA IN CRPL F227

			PAGE	
			TABLE	FIGURE
MAUI, HAWAII	1962	APR.	2	27
MUNDARING, WESTERN AUSTRALIA	1959	APR.	25	50
	1959	JUNE	25	50
	1959	SEPT.	25	50
	1959	DEC.	25	50
OKINAWA I.	1961	MAR.	18	43
	1961	AUG.	10	35
	1961	OCT.	8	33
PARIS, FRANCE	1961	MAY	16	41
	1961	JUNE	13	38
	1961	JULY	12	37
PORT MORESBY, PAPUA	1961	NOV.	5	30
PRUHONICE, CZECHOSLOVAKIA	1961	SEPT.	9	34
RAROTONGA, COOK IS.	1961	JUNE	15	40
	1961	JULY	12	37
REYKJAVIK, ICELAND	1962	FEB.	2	27
	1962	APR.	1	26
	1962	MAY	1	26
SAO PAULO, BRAZIL	1961	MAY	18	43
	1961	JULY	12	37
	1961	AUG.	11	36
SINGAPORE, BRITISH MALAYA	1961	MAY	17	42
	1961	DEC.	4	29
SLOUGH, ENGLAND	1961	MAY	16	41
	1961	DEC.	3	28
SODANKYLA, FINLAND	1961	SEPT.	8	33
	1961	DEC.	3	28

				PAGE	
				TABLE	FIGURE
SOTTENS, SWITZERLAND	1961	SEPT.		10	35
	1961	DEC.		4	29
ST. JOHNS, NEWFOUNDLAND	1961	DEC.		3	28
TAHITI, SOCIETY IS.	1961	MAY		17	42
	1961	JUNE		15	40
TANANARIVE, MALAGASY REPUBLIC	1961	MAY		17	42
	1961	JUNE		15	40
THULE, GREENLAND	1962	JAN.		2	27
TIRUCHY, INDIA	1960	FEB.		24	49
TOKYO, JAPAN	1961	NOV.		5	30
TRELEW, ARGENTINA	1961	JAN.		19	44
	1961	JULY		13	38
	1961	AUG.		11	36
	1961	SEPT.		10	35
TRIVANDRUM, INDIA	1960	FEB.		24	49
TROMSO, NORWAY	1961	SEPT.		8	33
	1961	DEC.		3	28
UPPSALA, SWEDEN	1961	SEPT.		9	34
WAKKANAI, JAPAN	1961	NOV.		4	29
WARSAW, POLAND	1961	MAY		16	41
	1961	SEPT.		9	34
WHITE SANDS, NEW MEXICO	1961	MAR.		18	43
WILKES STATION, ANTARCTICA	1960	NOV.		19	44
WINNIPEG, CANADA	1961	SEPT.		9	34
YAMAGAWA, JAPAN	1961	NOV.		5	30

CRPL REPORTS

(A detailed list of CRPL publications is available from the Central Radio Propagation Laboratory on request.)

Catalog of Data.

A catalog of records and data on file at the U.S. IGY World Data Center A for Airglow and Ionosphere, Boulder Laboratories, National Bureau of Standards, Boulder, Colorado, which includes a fee schedule to cover the cost of supplying copies, is available upon request.

CRPL-F (Part A), "Ionospheric Data."

CRPL-F (Part B), "Solar Geophysical Data."

These monthly bulletins have limited distribution and are sent, in general, only to those individuals and scientific organizations that collaborate in the exchange of ionospheric, solar, geomagnetic, or other radio propagation data of interest to the CRPL. Others may purchase copies of the same data from the U.S. IGY World Data Center A for Airglow and Ionosphere, National Bureau of Standards, Boulder, Colorado.

"Ionospheric Predictions."

This series of publications is issued monthly, three months in advance, as an aid in determining the best sky-wave frequencies for high frequency communications over any transmission path, at any time of day for average conditions for the month.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price 15 cents. Annual subscription (12 issues) \$1.50 (50 cents additional for foreign mailing).

(NOTE: Tested sets of punched cards of the predicted numerical coefficients of numerical maps of the Ionospheric Predictions, for use with electronic computers, may be purchased by arrangement with the Prediction Services Section, CRPL, Boulder Laboratories, Boulder, Colorado.)

National Bureau of Standards Handbook 90, "Handbook for CRPL Ionospheric Predictions Based on Numerical Methods of Mapping." Price 40 cents.

National Bureau of Standards Circular 462, "Ionospheric Radio Propagation." Price \$1.25.

NBS Handbook 90 and NBS Circular 462 for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.
